Regarding:

Requesting the fire services, political leaders, and science community to form a Task Force to investigate the exposure of firefighters from PFAS toxins from Personal Protection Ensembles (PPE), and AFFF.

Greetings all,

This request comes on the heels of the December 12, 2017 letter to CDC ATSDR by Environmental Attorney Robert Bilott, C8 Science Panel member Dr Paul A. Brooks and Firefighter Chief Jeff Hermes.

Attorney Bilott is asking for testing and studies specific to Firefighters/First Responders, due to their direct contamination of PFOA/PFOS from their turnout gear, and their contact with AFFF.

On September 5th 2017, Attorney Bilott sent the 195 page 'FireFighter Letter' to the EPA, CDC/ATSDR and US Attorney General, demanding a reply within 60 days to his request.

https://www.documentcloud.org/documents/3988104-Firefighter-Letter.html

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September 5, 2017
CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Brenda Fitzgerald, MD.
Director
Centers for Disease Control and Prevention
Administrator, Agency for Toxic Substances and Disease Registry
US. Department of Health Human Services
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Patrick Breyese, CIH
Director
Agency for Toxic Substances and Disease Registry

Center for Disease Control
200 Independence Ave, SW.
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Jeff Sessions, Esq.
United States Attorney General
United States Department of Justice
950 Ave, NW.
Washington, DC 20530?0001

Re: Request for Coordinated Nationwide PFAS Health Study and Testing and

Notice of Intent to Sue

Re: Request for Coordinated Nationwide PFAS Health Study and Testing and Notice of Intent to Sue

Ladies and Gentlemen:

For many years, unusually high rates of cancer and other adverse health effects have been observed among our nation's fire fighters and emergency responders(collectively ?Responders?), particularly among Responders who handle or use firefighting foams made with highly fluorinated chemicals (per? and polyfluoralkyl substances, including PFOA and PFOS) collectively referred to as or wear gear treated or made with such PFAS materials (collectively Equipment?). EPA acknowledged the risks posed by the entire family of PFAS in its Long Chain Perfluorinated Chemicals (PFCs) Action Plan, which was released over seven years ago, but has never been fully implemented. (See Ex. A (excerpts).) EPA has, however, recently confirmed that at least one PFAS PFOA - poses sufficient potential adverse effects for the environment and human health based on its toxicity, mobility, and bioaccumulation potential to support investigating and addressing its presence under the federal Superfund law codified in the Comprehensive Environmental Response and Liability Act of 1980, as

amended, 42 U.S.C. 9601 et seq. (See Ex.(excerpts) at 9.) Through the authority granted to ATSDR under that same Superfund law, ATSDR has classified PFAS as a class of chemicals that meet the definition of toxic substance within the scope of purview.1 Consequently, ATSDR has developed a draft toxicological profile for PFAS, issued various statements and guidance to impacted individuals and physicians dealing with certain PFAS exposures, and even agreed to partner with a handful of state or local entities investigating specific instances of specific types of PFAS contamination in specific communities. (See Ex. C.) To date, however, ATSDR has not embarked on any coordinated, comprehensive nationwide study or investigation of the impacts on the health of Responders from their use and exposure to PFAS Equipment, or associated testing of all such impacted individuals. We write to request that ATSDR move forward immediately with such a national study and testing.

As explained below, ATSDR has the clear power and authority to mandate a national study of PFAS health impacts and associated testing among Responders exposed to PFAS Equipment, has access to mechanisms to secure funding from responsible parties, and has a proven model to follow to implement such a study/testing. Based on our past decade of experience designing and overseeing a project to assess human health impacts from one such PFAS PFOA we stand ready to assist ATSDR in overseeing the design and implementation of a nationwide study and testing focusing on Responder exposure to the entire class of PFAS chemicals through a program that could encompass and involve all affected parties, including manufacturers, impacted Responders, and affected governmental entities/contractors and regulators, in a way that provides everyone with independent, credible scientific answers and certainty.

1. ATSDR Has The Authority To Require A National PFAS Health Study and Testing And Ability To Secure Full Funding For Such Work.

Under Section 104 of CERCLA, ATSDR shall "provide medical care and testing to exposed individuals, including but not limited to tissue sampling, chromosomal testing where appropriate, epidemiological studies, or any other assistance appropriate under the circumstances

in situations involving public health emergencies caused or believed to be caused by exposure to toxic substances. (42 U.S.C. 1 See also 42 U.S.C. 9604(i)(18).

This is a non-discretionary mandate. Thus, under this provision of CERCLA, ATSDR (which, as noted above, already has classified PFAS as a toxic substance) is not only authorized to conduct epidemiological studies and testing in circumstances where there have been excessive PFAS exposures, but is required to do so.

EPA repeatedly has indicated that situations involving excessive levels of PFAS exposure qualify as public health emergencies mandating cessation of such exposures.

For example, as early as 2002, EPA entered a consent order in which it found that levels of a PFAS (PFOA) exceeding the non-regulatory threshold used by EPA at that time presented a sufficient threat of imminent and substantial endangerment to warrant the provision soon as practicable of alternative drinking water to those exposed. (See Ex. (excerpts).) EPA entered similar orders noting the threat of such imminent and substantial endangerment from excessive PFAS levels in drinking water, mandating immediate alternate drinking water supplies, after EPA adopted its first provisional health advisory guidelines for short-term exposures to two different PFAS materials (PFOA and PFOS) in 2009. (See Ex. (excerpts).) EPA reaffirmed this position as recently as January 2017 when it modified one of those same consent orders to require immediate clean water if levels of PFAS exceeded new long term health advisory level of no more than 0.07 for individual or combined levels of PFOA and PFOS. (See Ex. F.) EPA noted that these new, lower PFAS drinking water guidelines were based on review of the best available peer-reviewed studies" indicating that exposure to these PFAS may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants low birth weight, accelerated puberty, skeletal variations), cancer testicular, kidney) liver effects tissue damage), immune effects antibody production and immunity), thyroid

effects and other effects cholesterol changes) (Ex. G.)actions to date confirm its recognition that studying PFAS contamination issues falls squarely within its broad authority.

As recently as May 23 of this year, ATSDR released the results of its own assessment of whether an epidemiological study by the Agency of those exposed to PFAS contamination would be feasible.(Ex.excerpts).) ATSDR confirmed in the context of evaluating the feasibility of studying adverse health effects among the adults, children, and military personnel exposed to multiple PFAS compounds in drinking water at the Pease International Tradeport that undertaking such a study could generate important scientific knowledge about the health effects of PFAS exposures, in particular, PFOS and exposures, if the study could be designed to encompass a sufficiently large population of impacted people. (Id. at 2.) In order to properly and thoroughly study certain types of less common diseases (including cancer) associated with these PFAS exposures, ATSDR acknowledged that there would need to be far more than the couple hundred or even couple thousand anticipated study participants at that one site, which might be feasible if a much larger number of individuals was incorporated into the study. (Id. at 43.)

II. A Proven Model Exists For Developing A National PFAS Health Study.

Settlement of a prior class action lawsuit in which we represented the plaintiff class resulted in the creation of an independent scientific panel that studied the effects of PFOA contaminated drinking water among a class of approximately 70,000 people whose drinking water supplies in West Virginia and Ohio had been contaminated with quantifiable levels of the chemical (0.05 at the time) attributable to releases from the Washington Works manufacturing plant then-owned by E. I. du Pont de Nemours Company (DuPont).

Through an innovative settlement with DuPont in that case (known as the Leach Case), we were able to secure sufficient funds to pay for: 1) blood testing of approximately 69,000 people through a Health Project";

2) creation of a new Science Panel of independent, world-class epidemiologists charged with confirming which diseases were linked to PFOA exposure among the class being studied;

3) the design and implementation by the C8 Science Panel of approximately a dozen extensive epidemiological studies and retrospective exposure modeling work, including class wide studies of the exposed population;

4) provisions for immediate and long-term clean water/water filtration; and

5) medical monitoring/testing for all class members for each disease linked to their PFOA exposure. (See and Through that settlement, we also were able to secure a binding agreement up front on how the results of the independent scientific work would be used in connection with future injury and compensation claims among the Leach Case class members, including the extent to which the independent scientific work would conclusively resolve issues of general causation as between the PFAS chemical at issue and the class member exposures.

The settlement also included an agreement that all active litigation among the parties would be stayed and future filings barred (yet with all claims preserved and statutes of limitations tolled), pending the final outcome of the agreed scientific process.

The work of the C8 Science Panel (and the related CB Health Project) under this prior class settlement involved only one PFAS compound (PFOA) and only one responsible party (DuPont). There is no reason, however, why this same model cannot be expanded to the current situation facing Responders across the United States involving one or more (or a combination of) the other PFAS compounds in PFAS Equipment, potentially attributable to the actions of multiple

responsible parties. In fact, expanding the model to include multiple responsible parties and regulators provides the opportunity for creating a much bigger pool of funds and the opportunity to spread costs among a much bigger and more diverse group. Likewise, addressing the issue within the context of a national class provides the opportunity for the responsible parties to fashion common, global remedies that allow for uniform, consistent relief and treatment of impacted parties and greater financial, scientific, and regulatory certainty.

ATSDR already has acknowledged the significance and utility of the C8 Science Panel/C8 Health Project model and work for addressing health issues related to PFAS exposures. As noted by ATSDR in its May 23, 2017, draft feasibility assessment for

studies at the Pease International Tradeport, the 08 Science Panel's/08 Health Project's work, which focused on human impacts from PFOA contamination, allows ATSDR to focus future PFAS studies on the effects from exposure to other PFAS compounds, such as PFOS and the synergistic/combined effects of being exposed to multiple PFAS compounds (including PFOA) at the same time. (See Ex. at 3.) In short, the C8 Science Panel and 08 Health Project work allows ATSDR to start from what is already known and addressed by the 08 Science Panel and 08 Health Project with respect to the adverse effects of PFOA, and direct its resources toward studying the effects of Responders being exposed to one or more (or a combination) of the other PFAS materials through their use of PFAS Equipment.

Now Is The Time To Act.

It is imperative that ATSDR take action now to respond to this ongoing, imminent and substantial threat to the health of Responders across this country. Every day, more Responders are being diagnosed with cancer or other serious illnesses after working for years with PFAS-based firefighting foams or other PFAS Equipment. Every day Responders across the country are spraying PFAS based foams or donning gear that was made or coated with PFAS materials. (See e.g.

Ex. J.) Our nation's Responders deserve nothing less than immediate, credible, scientific answers to exactly what this mix of PFAS compounds in PFAS Equipment has done or will do to them. We already know that this particular group of Americans suffers from unusually high levels of serious disease, including multiple forms of cancer. (See Ex. I (example health study excerpts).) They have a right to know whether the same equipment they relied upon to help save lives the firefighting foam, fire-protection gear, and other PFAS Equipment has put their own lives at risk for these terrible diseases.

ATSDR is uniquely endowed with the legal authority and ability to fashion a response that addresses this problem in a comprehensive, coordinated, national basis among all necessary parties. ATSDR also has the rare ability and power to require those deemed responsible for such harm, including any military or other governmental entities, to pay for and/or fund such work. (See 42 U.S.C. 9604(i)(5)(D),

Given own recognition of the feasibility, importance, and needto study the effects of multiple PFAS exposures and its statutory authority and authorization to do so, continuing failure to do so provides a basis for a national class of all Responders who used PFAS Equipment to bring a citizens suit against ATSDR to force such action in the United States District Court for the District of Columbia, sixty days after ATSDR receives written notice of its failure to comply with this statutory mandate. (See id. 9659.)

This letter serves as such a notice to ATSDR on behalf of our client, Mr. John Jeffrey Hermes, 6441 Cottontail Trail, Burlington, Kentucky 41005 as a representative of a national class of all such Responders. Mr. Hermes is a prostate cancer survivor who has been a career Responder for over 25 years and has used

PFAS Equipment during most of that career, including PFAS-based firefighting foams and gear made and/or coated with PFAS chemicals.

We remain hopeful that this matter can be resolved within the next sixty days without the need for pursuing any citizens' suit. We are

available to meet with you to discuss and fashion a Consent Order or other document that will allow the matter to be addressed and resolved in a coordinated, uniform manner among all impacted parties, using the prior CB Science Panel/08 Health Project and related settlement model.

Sincerely,

Robert A. Bilott

Greetings,

I am not affiliated with any group or organization. I am receiving no legal representation from any party and neither my husband nor I are engaged in any civil matter at this time.

My name is Diane Cotter of Paxton Massachusetts.

I am the wife of 27 year professional firefighter diagnosed with cancer in November 2014. He is currently cancer free. He served 27 years on the Worcester, MA fire department. Twenty-plus years on Rescue 1. It was his passion and the love of his life. His happiness and pride in his job made for exciting and very interesting conversation daily. It goes without saying that his family on the job became our family. Vacations, dinners, sleigh rides, cookouts, we did it all with our WFD family. I loved seeing my husband in uniform every day. It gave me so much pride. I loved hearing the thunderous greeting he gave when coming home and his size 14 boots slamming on the stairs as kind of a 'signal' he was home. Loved hearing the stories of his career, or the mundane issues of the kitchen or the sitting room. He loved coming into Franklin Street Station and yelling out 'Annnnddddyyyyy' as loud as he could, to rattle the walls, to the delight of the neighborhood friendly that made himself at home in the tap room, that they all made feel like one of the gang. Or hearing he got on the loud speaker to announce "everyone in the weight room now!!! We're gonna lift like men!!".. Or challenging the younger guys to climb 'up' the 3 story fire pole like he did. Paul made the decision to take the Lieutenant exam after 27 years as he did not want to leave the Rescue. It meant he most likely would be leaving his group. But for the betterment of our family, he made the difficult decision to take the exam.

Paul was made Lt on Sept 19, 2014. On November 19 he was diagnosed with cancer.

The words are breathtaking when you hear them. You really don't hear anything else. Your mind tries to process what you just heard and tries to find some way to figure out if you are going to live or die even before you know what you're facing. Paul had prostate cancer. He was a Gleason 7. Surgery was scheduled with Dr Ingolf Tuerk of St Elizabeth's Hospital in

Brighton, MA. His surgery was successful but left him unable to perform the duties of a firefighter.

During his rehabilitation at home we searched for reasons and answers to why such a healthy 55 year old would have prostate cancer with no family history including 2 brothers, his dad, uncles and many first cousins.

BFD had just come out with a video on FF cancer. I was shocked at how prevalent it was. We were veterans of the fire service. We knew plenty of FFs with cancer. No shocker there. But it shocked me the many different types of cancer in the fire service. Words I'd heard for many years now had new meaning. 'Products of combustion', off gassing, decontamination…'

I fell into a rabbit hole of research and reached out to many in the fire service, environmental activists and scientist. I received a follow-up call one day from Erin Brockovich in which she explained she was contacted by members of the fire community. She asked if the gear had PFOA. I had never heard of the word. That one question led to hundreds of hours of research. We learned that in Europe, beginning in 2006, the European Chemical Agency notified chemical companies, textile manufacturers, and anyone that used the product PFOA or its precursors, that they would be restricting the use. The ECHA, in its 385 page 'Background Document on PFOA' discussed the reasons for the chemical restrictions. The Risk Assessment Committee to determine the amounts they (the ECHA on behalf of the EU) would approve for use in textiles, and one of those textiles was Personal Protection Ensembles. The manufacturers were given the opportunity to comment on the potential issues or hardships they would face with the new regulations. In 2014 The ECHA had notified textile manufactures they had set the limit of PFOA to 2ppb in Firefighter turnout gear. The manufacturers protested, saying they wanted the PPE 'derogated' completely from the new regulations. They wanted to shelve FFs PPE altogether. Leaving it UNCHANGED. No rules on FF PPE .There reasoning was it was too difficult to meet the rigors of EN 479 (http://www.flasa.ch/en/normes/469.pdf). ECHA said 'no way'.and after negations, it was decided the maximum limit of PFOA in turnout gear must not exceed 25ppb. This is more than the 2ppb ECHA asked for.

In 2008 the ECHA ruled/deemed PFOA a SVHC. Substance of Very High Concern.

Here in the USA, PFOA is considered a 'Contaminate of Emerging Concern'.

Sharp contrast.

I found literature from the 2016 European Firefighter PPE symposium discussing 'the potential transition to non-PFOA PPE'. Exact words. Discussing 'legal issues, and where to discard existing PPE, and that the transition was to take place by the year 2020. The speakers at the symposium consisted of manufacturers who spoke openly about the new regulations.

That finding led to the search of what was happening here in the USA. With the help of Jason Burns, Local 1314 President, Fall River MA, he approached the PFFM to investigate. That took many weeks to receive word from the IAFF. We were disappointed with their response.

Research continued and with it more findings, such as:

Per this 2000 patent on Water Resistant protective garments for firefighters, we have enough 'coating' in our PPE to withstand 30 washings. But, we are not allowed to know how much chemical content is in the gear, or the chemicals used, as the manufacturers consider that 'proprietary'.

Water resistant protective garment for fire fighters
US 6065153 A
ABSTRACT

https://www.google.com/patents/US6065153
A protective garment of the type typically worn by fire fighters with improved water resistance is disclosed. In particular, the present invention is directed to an outer shell material for protective garments that is made from a fire resistant material coated with a durable water resistant coating. The durable water resistant coating is applied to the outer shell in a manner so that the coating will not degrade when exposed to normal wear and tear and even after the garment has been laundered repeatedly. Protective garments constructed in the past typically lost most of their water repellency after being laundered as little as five cycles. It has been discovered that water resistant coatings applied according to the process of the present invention, on the other hand, can survive at least 30 laundry cycles, and in many applications at least 50 laundry cycles without significantly degrading.

And... In the US alone, PPE is a 5 billion dollar a year business.

https://www.bccresearch.com/market-research/advanced-materials/advanced-protective-gear-armor-report-avm021h.html

Report Highlights

The U.S. market for advanced protective gear and armor has reached $4.5 billion and $4.7 billion in 2013 and 2014, respectively. This market is expected to reach at compound annual growth rate (CAGR) of 4.4% to nearly $5.9 billion in 2019.

Report Includes

An overview of the U.S. market for advanced protective gear and armor.
Analyses of the U.S. market trends, with data from 2013 and 2014, and projections of CAGRs through 2019.
Emphasis on the following sectors of the market:
Heat- and flame resistant clothing, including firefighters' turnout gear for structural, proximity, and wildlands fire service, as well as industrial fire resistant garments for use in electric and gas utilities or in industrial applications in which electric arc and flash fire are hazards.
Chemical protective garments and equipment, including chemical-resistant clothing, chemical or biological warfare and protective suits, and gloves used in industrial applications. Much of this same gear can be used for biological protection.
Respirators and ancillary components for fire and chemical/biological situations....

Further research found DuPont was concerned about 'financial challenges of PFOA restrictions:

But in 2005, DuPont was very concerned about the 'Growing Financial Challenges' of the restrictions and regulations of PFOA:

E.I. du Pont de Nemours and the Growing Financial Challenges
of PFOA
2005 - The Shareholder's Right To Know More
Potential Impact on Product Lines
In the event that PFOA is restricted through regulation, or in the event that markets migrate away from the use of products made with PFOA, or that break down into PFOA, the impact on DuPont could be substantial. Analysts at JP Morgan have estimated that DuPont's PFOA-related product lines, fluoropolymers and telomers products, contributed about $1.23 billion to 2003 sales and $100 million to profit. DuPont's earnings in 2003 were $973 million on revenue of $27 billion. (page 23)
https://www.healthandenvironment.org/.../DuPont_Shareholders_...

DuPont's 43 page warning to firefighters about FF cancer., not one mention of PFOA or PFAS used as a water repellent. Mysteriously, PFAS is not even mentioned in this 43 page 2016 page piece.

http://www.dupont.com/content/dam/dupont/microsites/dpt/Nomex-Knowledge-Center/PDFs/DuPont%20Mitigate%20Smoke%20Particles%20Oct042016.pdf

2017, Still... no word to America's bravest about the toxins in their turnout gear.

https://www.atsdr.cdc.gov/toxprofiles/tp200-c5.pdf

According to DuPont, PFOA is produced at trace levels as a byproduct during the manufacture of fluorotelomer products; however, DuPont specifies that PFOA is not used to manufacture its fluorotelomer products (DuPont 2008). DuPont has announced that a new manufacturing process has been developed for its fluorotelomer products that are based on short-chain chemistry. The company claims that this new process will remove >97% of trace levels of PFOA, its homologues, and direct precursors from DuPont fluorotelomer products. The chemicals that will be involved in

DuPont's new manufacturing process are not identified. Based on statements made by the 3M Chemical Company, theshort chain perfluoroalkyl, PFBuS, may play a role in new technologies that will be used to reformulate products affected by the phase out of PFOA and related perfluoroalkyls (3M 2008a)

There are studies that show our gear degrades. We have no dust studies in our firestations to warn us if we are eating and inhaling this toxin from the years of degrading gear.

The additional concern of our gear degrading in our station bays adds to the urgency to test stations for PFCs where our firefighters work, eat, and sleep.

Accelerated Weathering of Firefighter Protective Clothing

Yet, we do know firefighters 'may have unidentified sources of occupational exposure to perfluorinated chemicals:

http://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1746.pdf

Biomonitoring in California Firefighters

Metals and Perfluorinated Chemicals

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274322/

Conclusions:

Perfluorodecanoic acid concentrations were three times higher in this firefighter group than in NHANES adult males. ***Firefighters may have unidentified sources of occupational exposure to perfluorinated chemicals.***

For those unfamiliar with the prevalence of cancer in first responders please see this detailed report:

http://services.prod.iaff.org/ContentFile/Get/10166

Cancer In The Fire Service

Along with the NIOSH report dedicated to firefighter cancer. (Updated regularly)

FIRE FIGHTERS Study of Cancer among U.S. Fire Fighters

https://www.cdc.gov/niosh/firefighters/ffcancerstudy.html

At any point, in the last 20 years, DuPont OR ANY manufacturer could have submitted the following to NFPA "Statement of Problem and Substantiation for Public Input" that I saw referenced in Structural FF PPE ROP's

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4724210/

For factors related to consumer product use, we observed significantly higher concentrations of PFOS and marginally significantly higher concentrations of PFDA , PFOA , and PFHxS for participants wearing stain-repellant clothes once per week or more

This past March, an article was published on my husband and me in Station Pride. It was titled 'The Real Cancer In Your Gear'. It was shocking to say the least and drew much concern and confusion as the front line was taken back by the thought they were wearing this toxin and were never informed.

https://station-pride.com/2017/03/28/the-real-cancer-in-your-gear/

See also the follow up article the published the fluorine test results of '2004, new, never-worn PPE'
https://station-pride.com/2017/09/07/fire-gear-pfoa-the-data-the-real-cancer-in-your-gear-follow-up/

We had the moral right to be informed. Manufacturers rushed to send out statements explaining they 'do not use PFOA in the manufacturing process' or 'they do not use PFOA but it may appear as a 'trace' amount. What is a 'trace' amount?

In particular concern was the past use of the ECF electrochemical fluorination method used in previous years that delivered a 'more dangerous form of PFOA'.

Not one manufacturer took ownership of concern for years of degrading PPE in our stations. They alone know how much of the toxins were impregnated in our gear. No one else does.

IAFF stated " It is possible fire fighters are exposed to PFCs through fire fighting foam and to PFCs used to make fire fighting gear water and stain resistant."

As well as the 2015 IAFF Publication; Fire Fighters and the Evaluation of Cancer Causation,

Pages 53 - 62: http://services.prod.iaff.org/ContentFile/Get/10183

Perfluorinated Alkyl Substances (PFAS) Stain-resistant coating on upholstery, carpets, performance clothing, non-stick coatings on cookware, food wrapping, surfactants in firefighting foams Endocrine disruptors, liver, heart disease, cancer (PFOA)

And:

Teflon Chemical Might Be Unsafe at Any Level New study shows EPA drinking water standards 100X too high (Grandjean and Clapp 2015) PFOA (C8) Levels in Fire Fighters vs General Population Pages 53 - 62: http://services.prod.iaff.org/ContentFile/Get/10183

See here under Toxic Exposure :
http://www.iaff.org/HS/SubstanceExposures/PDF/PFCs_FactSheet.pdf

IAFF PFC FACT SHEET: Toxic Exposure: Very little research has been done about occupational exposure to PFCs among firefighters. It is possible that firefighters are exposed to PFCs through firefighting foam and to PFCs used to make firefighting gear water and stain resistant

Yet, in May 2017 the IAFF did make an official statement on PFOA:

https://docs.wixstatic.com/ugd/fbe7dd_cc4b2d5a744b4b1f8ca967ab94a64978.pdf

Excerpt from THE IAFF STATEMENT ON PFOA:

What PFOA regulations exist?
In addition to the voluntary US efforts to phase out PFOA and recent Canadian regulations, governments in the European Union (EU) have been pursuing regulation to formally restrict the manufacture and use of PFOA in new products. Based on EU regulatory submissions first made by Germany and Norway in 2014,
** it was concluded that "an unacceptable risk to human health
and the environment arises from the manufacture, use or placing on the market of PFOA, its salts and PFOA-related substances on their own, as a constituent of other substances, in mixtures and in articles". Draft EU regulations would now prohibit the use of PFOA in the production of textiles, including in consumer products, 6 years after the draft regulation comes into effect.

Conclusions
Exposure to PFOA is very common in US and Canadian populations due to its extensive past use in a wide range of products from carpets to stain and water resistant fabrics and upholstery to nonstick cookware. Importantly, PFOA use has been almost completely phased out in the US under the PFOA Stewardship Program and in Canada through recent regulation.
Fire fighters may have additional PFOA exposure sources such as older Class B firefighting foams. If PFOA is a combustion product of PFOA-containing consumer products made prior to phasing out use of this chemical, fire fighters will be exposed in fire suppression activities. However, the data are too limited at present to determine this. PFOA is unlikely to be a component in recently US manufactured turnout gear. However, if PFOA is a combustion product, it may be present as a contaminant on turnout gear. PFOA may also be present as a manufactured component of legacy turnout gear, or in turnout gear manufactured in other juridictions. The exposure contribution from any such PFOA content is likely to be minimal since volatilization from the manufactured product would be required.

Recommendations
At this time, IAFF does not recommend that legacy turnout gear be replaced outside of its lifecycle. Fire fighters wishing to minimize PFOA exposure should continue to wear their PPE,

including SCBA, and regularly decontaminate their turnout gear. IAFF will continue to monitor
developments and update this fact sheet should new information become available.

This is in sharp contrast to the IAFF's stand on Toxic Flame Retardants, which brought Resolution 34:

RESOLUTION 34

http://iaffconvention2014.org/resolution-no-34/

Resolution No. 34
COMMITTEE ASSIGNMENT: Health & Safety
Re: Toxic Flame Retardants and their Contribution to Cancer and Health Issues in the Fire Service

WHEREAS, the International Association of Fire Fighters has recognized through multiple cancer studies on fire fighters the proven correlation between firefighting and occupational related cancer; and

WHEREAS, since 2002, 56 percent of the Line of Duty Deaths reported to the IAFF have been the result of occupational cancers and that this unacceptable statistic is one of the major health related issues facing our members; and

WHEREAS, the continual mounting weight of scientific data points to fire fighters having a much higher risk of developing cancer due to their contact with known carcinogens, to include flame retardants, due to skin absorption, ingestion, breathing of air and other routes of exposure during and after a firefighting incident; and

WHEREAS, the toxins contained within chemical flame retardants, and those compounds released when they burn, contribute to high rates of certain cancers among fire fighters. When chemical flame retardants burn they convert into dioxin and furans, which expose fire fighters to dangerous levels of extremely toxic and cancer-causing chemicals that can penetrate protective gear; and

WHEREAS, representatives of the major manufacturers of these flame retardants, in the states where they have legislatively opposed banning the use of these carcinogenic flame retardants, have been shown by investigative journalists and our own affiliates in these states, to use a campaign of misinformation, lies, and deceit; and

WHEREAS, chemical industry interests attempts at the federal level to amend preemption language in the Toxic Substances Control Act (TSCA) that far exceed the preemption provision currently in place under TSCA; and

WHEREAS, an analysis of 32 related fire fighter cancers studies published in the *The Journal of Occupational and Environmental Medicine* along with the recent NIOSH and Nordic fire fighter cancer studies established that fire fighters have significantly elevated rates of cancer, which is likely due to their routine exposure to complex mixtures, such as the toxic products created when chemical fire retardants burn; and

WHEREAS, the presence of certain chemical flame retardants are a direct threat to the health and safety of our members. More importantly, they are a threat to the health and safety of the people we are sworn to serve. That's why the IAFF has established a position and strategy paper on the ban and restriction of flame retardants and actively endorsed the updated California flame retardant standard TB-117-2013 and continue to support state and provincial associations that are pursuing legislation such as California Senate Bill 1019; and

WHEREAS, the National Fire Protection Association, International Code Council, Underwriters Laboratories and other similar organizations play an important role in the development of flame retardant tests and related standards for upholstered furniture, furniture textiles and the like; and

WHEREAS, firefighting has inherent risks, but all efforts to minimize fire fighters' exposure to toxic chemicals and other fire ground health and safety issues must be aggressively pursued; therefore be it

RESOLVED, That the IAFF formulate a position on the use, regulation, testing and health-based safety standards for flame retardant chemicals and other toxic chemicals, which fire fighters are exposed to on a daily basis; and be it further

RESOLVED, That the IAFF ensure that any federal legislation on the use or manufacturing of flame retardants, industrial chemicals and other toxins shall protect the rights and abilities of state and municipalities to enact laws regarding the use of said products, while opposing any and all federal legislation that has preemption against allowing states to ban or regulate flame retardants, industrial chemicals, toxins and other specific hazardous chemicals; and be it further

RESOLVED, That the position of the IAFF will continue to support affiliates at the local, state and provincial level in any attempt to ban flame retardants, industrial chemicals and other known toxins through legislation, regulation or standard changes; and be it further

RESOLVED, That the IAFF work to ensure that the use of carcinogenic flame retardants and other toxic chemicals are eliminated and safer alternatives or methods are pursued, such as California's standard

TB-117-2013, including the development of non-toxic standards through the National Fire Protection Association, International Code Council, Underwriters Laboratories and similar testing Organizations; and be it further

RESOLVED, That the IAFF gather additional scientific research and studies regarding fire fighter exposure to carcinogens, toxic flame retardants and other toxic chemicals, as well as continue to educate, train and heighten the awareness of its members to the dangers of these toxic chemicals and seek preventative measures to lessen fire fighters risk of developing cancer.

Although the health effects of PFCs are well documented and well known, we have over looked our nations fire fighters and their elevated PFC serum levels in what is a tragic case of 'duties of the job' causation and justification. Namely, because firefighters encounter so many toxins, it is easy to say the serum counts come from products of combustion. We never knew our gear was impregnated with PFOA. That makes for a different course and should be examined thoroughly.

In previous years the method of ECF (Electrochemical Fluorination) to impregnate the gear was used. It delivered a C8 in more dangerous form. Manufacturers did know of this danger dating back to 1999 but neglected to tell the end user, this nation's fire fighters. Even while they sat as voting members of NFPA FF PPE standards committees.

Please view *http://www.fluoridealert.org/wp-content/pesticides/effect.pfos.class.timeline.htm*

PFOA/PFOS timeline to cross reference dates of events with the years that DuPont's representatives sat on NFPA committees discussing fire fighter safety. Even while DuPont was in litigation for this toxin, there was no mention of this. Only they knew the amounts that were impregnated in the gear. No one else.

There is a portion of NPFA committee standards that allows a committee member, or anyone for that matter, to submit a "Statement of Problem and Substantiation for Public Input" .This was never done. Even though 2003 the C8 Science Panel had convened, and DuPont had been concerned for it's own plant workers since the 1960's over PFOA. Most importantly, in 2006 the ECHA notified textile manufacturers they were concerned enough about PFOA to begin it's work to produce the 385 page 'Background Document on PFOA' :

https://echa.europa.eu/documents/10162/61e81035-e0c5-44f5-94c5-2f53554255a8

The problem we have is that we have no idea how much of the 'chemical additives' are in our PPE. We have no idea how much was used in the last two decades. There are no regulations in place in the USA to mandate safe amounts of PFAS in our PPE.

Europe has been aware, and acting on limits of PFOA and its precursors PPE issue since 2006. The European Chemical Agency notified all manufacturers of textiles that used PFOA that they would be reviewing toxicity and determining if PFOA was a Substance of Very High Concern. In 2012 ECHA determined PFOA to be a SVHC Substance of Very High Concern.

What is of extreme concern is combined amounts of PFOA toxicity via inhalation, ingestion, and dermal absorption. Please see attached '2014 Understanding the exposure pathways of per-and polyFluoralkyl substances via use of PFASs containing products'. The use of back calculating could be used to determine those most at risk, as per the 'ECHA Background Document on page 125:
https://echa.europa.eu/documents/10162/61e81035-e0c5-44f5-94c5-2f53554255a8

Due to increased body temperature during firefighting, our firefighters skin permeability increases with temperature; for every 5-degree increase in skin temperature, absorption increases 400 percent.

The manufacturers who produce the turnout gear are well aware of this. They offer financial support of our cancer research, they teach best practices for cancer prevention at our cancer symposiums, and publish multi page pamphlets on cancer prevention, as well as serving on our NFPA various PPE committees discussing standards for safer turnout gears.

For twenty years this has gone unnoticed and unchecked. Studies of diesel exhaust and plastics have been done in our stations. However, no PFAS dust studies have taken place. An average station may have 3 trucks x 4 ff's/officer x 4 shifts x = 48 sets of gear that are degrading in a station 364 days a year over the last twenty years (1999 is the earliest confirmation I could find of PFOA being used in PPE).

This 1999 document from 3M indicates on page 113 under Market Catagory, Technical Textiles/other shows End Use of awnings, boat covers, protective clothing, tents, backbacks. This document clearly shows the 'protective clothing' is not grouped with the 'outerwear' End Use; raincoats, category.

https://www.fluoridealert.org/wp-content/pesticides/pfos.fr.final.docket.0008.pdf

This 1999 3M document shows 3M KNEW THE ROUTES OF EXPOSURE FROM CHEMICALLY TREATED PRODUCTS FOR WATER REPELLENT WERE DERMAL AND INHALATION. 1999.....

https://www.fluoridealert.org/…/pfos.fr.final.docket.0008.p…

3M : 1999 report Estimated Exposure Times:
Low= *I hr., 60 days
Med. I-4 hrs, 50-I 00 days
High= ~4 hrs., > 100 days
****

FROM 1999 3M REPORT....
page 197:
F. Coatings and Coating Additives

1. Business Definition
2. Products and Market

page 214:
F. Coatings and Coating Additives
Coatings-This segment includes formulators who utilize 3M fluorochemical polymer coatings as received or in combination with other materials to import soil or water repellency to a surface. Typical applications include application of such coating to household or commercial surfaces or electronical or electronic components.
Products
CA-5
CA-6

page 311
CA-5
Most Likely Route of Exposure
End Use Coating; DERMAL , INHALATION

Also from same report, and regarding AFFF, 3M knew in 1999 the routes of exposure for a firefighter were dermal and inhalation. **3M Report 1999, PG 235, AFFF FIREFIGHTER EXPOSURE; DERMAL, INHALATION, INGESTION**

What we don't know is amounts of PFAS's used in the gear as the manufacturers' state that is proprietary information. However, make no mistake about it, the manufacturers know that gear degrades in UV light. They preach not to put it in UV light, but they omitted that it also has a PBT toxin in it. So while we are sleeping, and breathing, and eating from surfaces we prepare food on, just how much PFAS is in our stations? We do not know.

Meanwhile, our gear is 'weathering' / degrading in the station bays:

https://www.nvfc.org/wp-content/uploads/2016/08/NIST-Report-on-Accelerated-Weathering-of-PPE.pdf

PAGE 29: 4. Summary and Conclusions: However, exposure of NKB and KPB fabrics to simulated UV light caused rapid and extremely large loss in tear and tensile strength. The aging performance profiles (APP) of both the fabrics were similar in that significant deterioration occurred due to 13 d exposure to UV irradiation. (note: 13d exposure to UV irradiation in this study = 6.6 years of normal use, so don't think the deterioration occurs in 13 days please.)

This study indicates that the deterioration in the physical properties of polyaramids and polybenzimidazole are mainly due to photooxidative reactions, which change the chemical composition of the polymeric system

The photochemical reactions are associated with build-up of oxidation reaction products and new polymer end groups. These changes are known to be responsible for the loss in tensile strength as well as the color change.

The ECHA has mandated that the manufacturers have until 2020 to rework their products to contain no more than 25 ppb PFOA. This is up from the original 2ppb the ECHA originally desired after the manufacturers comments and opinions noted in the 2015 ECHA Background document.
While these chemical giants have agreed to participate in the Stewardship Program that does little to ensure the end user that they are not wearing a toxin laden garment. There is no knowledge of how

much material was still in effect when the 2015 Stewardship Program took effect, nor is there any knowledge of back stock that may have been used.

There is no guarantee to the end user that the chemistry now used is safe either. Although the manufacturers state they no longer use PFOA in the production process., they omit that there is PFOA as a 'unintended byproduct of production'.

This is very troubling as we have been under the omission factor of the manufactures for the past 2 decades.
Back calculating the PFOA in a firefighter should also be addressed. Many of our stations have been in existence for decades. In addition to the PPE, the AFFF used in incidents, training, or replacing of old foam for new is another concern. A quick 'Google' will reveal photos of FF's sprayed head to toe in the mist while wearing their gear during training or actual use. This gear then came into stations.

Also concerning is handling of containers of foam stored on trucks. See attached 'Pearce Fierys speak out' for a look at how firefighters are told to think of the foam as 'dishwashing liquid' as they are literally covered in it. Some departments are using the 'old foam' to train with still.

Although the article is based in Australia, the same practice was used here in America.

http://echonewspaper.com.au/pearce-fireys-speak/

The firefighters said every shift they tested fire trucks to make sure they were making foam and made sure tanks were topped up.
All three said firefighters had been encouraged to treat the foam as a high-grade detergent and to put their hands in it.
They said checking the level of a tank meant sticking their arm in the tank so they often had an arm almost up to the elbow in the mixture.
The tests were not always carried out in the same spot so the chemicals were spread around the base.
"Also the foam was dumped or sprayed out before a truck was serviced," they said.
They also worried the basic protective gear they had worn would have given them little protection and that they most likely exposed their families to the chemicals when their gear was washed at home.
All three said they have some health issues associated by some researchers with the toxic chemicals.
National Toxics Network senior advisor Mariann Lloyd-Smith, who is also the International POPs Elimination Network senior policy advisor said there was no argument for the continued use of per- and poly-fluoroalkyl substances (PFAS) in any firefighting foams as they were toxic and bioaccumulative, which meant they built up in all living organisms.
"The need to protect firefighters to the greatest degree possible as well as protection of the environment and communities is the main objective."
She said following the class action between Dupont (a manufacturer of Teflon which contains PFOA) and US residents in the vicinity of a major contamination incident the jointly established C8 Science Panel concluded PFOA could cause kidney cancer, testicular cancer, ulcerative colitis, thyroid disease, pregnancy-induced hypertension and medically diagnosed high cholesterol in humans.

With Robert Bilott's letters to CDC/ATSDR/EPA of September 5th, and December 13th, I am asking the CDC and the EPA to initiate an immediate testing of fire stations to determine PFOA and PFOS levels in stations, particularly in sleeping quarters, eating areas, and bay walls and vents where dust has been accumulating for decades. Who am I to make such a request? I am the wife of a firefighter who has lost too much. On a personal level, what we have lost is immeasurable. Our lives have changed in a way I never thought possible. We don't know who we are, my husband has lost his purpose. We try

very hard to support and comfort one another but most days we are trying to adjust to our new normal. Prostate cancer takes pieces that are very seldom discussed.

This is not about 'washing gear', or products of combustion. This is blatant omission on the part of the same manufacturers that garment our nation's fire fighters and have the audacity to educate our nations bravest without a single whisper of the toxin that is impregnated in their gear. How do we mitigate against a toxin if we don't know it's in our gear to begin with?

Additionally, the new generation coatings in our gear are not without controversy, and again, we have no numbers to accurately explain how much use of 'precursors' may degrade to PFOA, or how much PFOA is made as a 'unintended byproduct of production'. The manufactures now state they "no longer use PFOA". They neglected to tell us for decades that they did. Why would we believe them now?

America's lack of efforts in this area are in sharp contrast to Europe's. They have begun symposiums to teach their fire service about the transition to non-PFOA PPE.

https://www.firerescueforum.com/content

PPE & Duty of Care Forum 2016

Personal protective equipment (PPE) is the last line of defence for firefighters yet few Fire & Rescue Services fully understand how the latest generation of protective clothing works or how it should be managed effectively in the light of imminent EU-wide chemical restrictions. At this one-day conference, you can.

What will it cover?

* Disposal of firefighting clothing that contains restricted chemicals
* Maintenance of clothing containing restricted chemicals
* Legal and financial obligations regarding current contracts
* Legal and financial obligations of service contracts
* Managing a potential transition to non-PFOA PPE

See also a more detailed description of the discussions at this seminar:
https://www.firerescueforum.com/content/programme.aspx

Please see the link provided and view pages 43 – 93. 'Burlington Presentations', Dr Roger Klein discusses the new C6 fluorocarbons and the precursors used in our PPE.
m.hemmingfire.com/news/get_file.../burlington+presentations+for+web+rev1.pdf

As far back as 1976, the workers at the DuPont plant were told to 'not bring home their work clothes' as was reported in this article by the New York Times about the attorney Robert Bilott and his efforts to expose the deceptions by the chemical companies DuPont and 3M regarding PFOA. This is important. In the years that my husband was a firefighter, from 1988 till maybe 2006 he brought his gear home. I washed it in my washing machine.

https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html

The serum levels of the 'DuPont Washington Works' workers were unheard of at highs of 32.9 ng/Ml. Yet, somehow, the numbers in the serum of our nation's firefighters have gone unchallenged at 453 ng/mL.

The elephant in the room.

In my opinion, we have been lulled into a false sense of security by the efforts of some manufacturers who preach to us about firefighter cancer precautions, fund our firefighter cancer research, symposiums, and events, sit on our NFPA FF PPE safety boards, and print multi page slick glossy ads about washing our gear and our bodies, wearing hoods, and scuba during overhaul. There is much talk about decontamination after the fire. It is no longer acceptable to not disclose to the end user what is in the chemical additives as a baseline starting point.

In some cases, our fire fighter cancer research organizations are funded in amounts well over $100,000.00 by the large manufacturers, and their child companies. A large manufacturer will often have a spin off company that makes coatings, or fabrics by subsidiaries of different names. It may not be obvious to anyone but these subsidiaries are the 'gold' and 'silver' sponsors of well over $100,000.00 to the fire services own cancer research organizations.
Who in their right mind would want to turn that kind of money away? We need that money for our fire fighter cancer research. Now we need it more than ever.

In my two years of research, I have seen the financials of DuPont in 2009, discussing the PFOA issue as a note to shareholders

And this important pamphlet to DuPont shareholders discussing the impact on DuPont should PFOA be restricted:

E.I. du Pont de Nemours and the Growing Financial Challenges of PFOA

https://www.healthandenvironment.org/docs/xaruploads/DuPont_Shareholders_Know_More.pdf (attached)

2005 - The Shareholder's Right To Know More Potential Impact on Product Lines

In the event that PFOA is restricted through regulation, or in the event that markets migrate away from the use of products made with PFOA, or that break down into PFOA, the impact on DuPont could be substantial. Analysts at JP Morgan have estimated that DuPont's PFOA-related product lines, fluoropolymers and telomers products, contributed about $1.23 billion to 2003 sales and $100 million to profit. DuPont's earnings in 2003 were $973 million on revenue of $27 billion. (page 23)

Yet… no word to America's Bravest

If any one of you were told you would be wearing coat and pants that were impregnated in toxin, and we couldn't tell you how much was in there because it is a trade secret, yet you only found out you were wearing it decades later because another country, was ahead in their planning of the removal of this SVHC, I assure you that you would be seeking answers.

The EU is ahead in that their own government is requiring limitations, they are not relying on the non legal binding Stewardship Partnership oath which was written by the same companies that neglected to tell us how dangerous the toxin is to begin with. The Stewardship Program did not require manufacturers to remove back-stock of fabric treated with PFOA. The Stewardship Program did not require manufacturers recall gear from retail or wholesalers of ready to wear PPE. They were allowed to use all back-stock and our firefighters may well be wearing this chemical now.

Again, I stress, the EU is not relying on the word of the companies who omitted this toxin to begin with. They are requiring their own regulations regardless of the word of the manufacturers.
I urge EPA to do the same.
The EPA must move forward to code this carcinogen properly, to limit the intake on this nations firefighters.

Our nation's fire fighters need legislation and protection at state and federal levels regarding the amounts of PFOA in the gear, as well as amounts of PFOS in the foam that has been used in training for decades.

Labeling

The issue is how much PFCs are in our stations, and how much is in every fire fighter in this nation that has donned the gear and/or been exposed to AFFF? In California, Proposition 65 requires everyone in

the chain of commerce receive clear and reasonable warnings prior to being exposed to certain chemicals. BOTH PFOA and PFOS are on this list as REPRODUCTIVE TOXICITY.
Out firefighters start out their careers in their child bearing years.

https://www.p65warnings.ca.gov/

That is not the case with our first responders. There is no warning. Although, these same manufacturers sit on our NFPA 1971 standards committees and discuss every aspect of PPE safety, from the balance of the helmet, to the width of the reflective tape used on the outer shell.
There are no 'warning labels' in our gear. There are 'product labels' but no warning labels. The reason why there are no 'warning labels'... is because the manufacturers want it that way.

FEMSA

The group FEMSA, Fire and Emergency Manufacturer Services Association, lobbied for, and won the right to not put warning labels in firefighting PPE. Stating it could cause an industry stopping crisis. This group is made up of manufacturers of PPE, AFFF, hoses, SCUBA equipment etc.,

Their effort is proudly posted on their history page, it is called the Liability Bill

https://www.femsa.org/whois_femsa/history/

A NEW FEMSA REGROUPS IN 1986 …

Product liability was the driving force that took FEMSA to a higher level in 1986. H.R. 1115, the Uniform Product Liability Act, singled out the fire and emergency industry with a provision making manufacturers of fire equipment and protective clothing presumptively liable in the event of injury to a firefighter. If enacted, the legislation would have drastically impeded manufacturers' ability to obtain adequate liability insurance, dramatically increased legal defense expenses, and thereby devastated manufacturers' ability to compete in the marketplace.

In a recent in-person interview with Kathleen "Kit" Cafaro, she recalled attending the 1985 Fall Meeting of the Fire Apparatus Manufacturers' Association (FAMA). During that meeting, she cautioned FAMA members about this proposed legislation. Attorneys representing FAMA at the time considered the position as unconstitutional, and that "it would never fly." Kit heard it said shortly thereafter that, "If you listen to Kit, you'll be as crazy as she is!" When Kit returned home that night, there was a phone message from her Congressman. She called him back, he asked for her position on the issue, and she indicated that it didn't matter as it would never get off the ground. The Congressman reported that it was flying through Congress and it was very much alive. With that information, Kit contacted then FAMA President Bill Darley. Suffice to say, this was the beginning of the end of FAMA's then current legal and management representation by TBEA … the issue was very much real. [Of note, by 1986, FAMA – having no management association leadership – was invited by FEMSA to hold its Fall Meeting with FEMSA; this kicked off the combined FEMSA/FAMA annual conference as we know it today.]

By 1987, the movement was in full swing. Several industry manufacturers regrouped to form a "new FEMSA" with a focused mission and objectives. Doug McMillan (Task Force Tips) served as Chairman/President, and Roger Hannay (Hannay Reels) served as Chairman of the Legislative Committee. In 1988, Kit Cafaro (MC Products) was elected as President, and Mary Grilliot (Morning Pride) was elected Vice President. They worked with McMillan and Hannay to launch a powerful effort to divert the crisis. Other key players included George Freese (Globe Manufacturing), and Ray Ridler (VFIS). In 1989, FEMSA contracted with The Spence

Group, an association management and lobbying firm, to mount its legislative defense and build up its association in the process. Sandra Spence was named Executive Director of FEMSA. She organized a membership and political action campaign, and by July of 1989, membership in FEMSA expanded to 124 companies. FAMA supported the issue as it directly impacted its then 60 member companies.

On June 21, 1989, H.R. 2700 was introduced in the U.S. House of Representatives. The bill included exactly the same language on presumptive liability affecting fire equipment and clothing as had been included in H.R. 1115 in 1988. A companion bill (S. 1400) was introduced in the Senate on July 25, 1989. This was a balanced bill with broad bi-partisan support that did not include any presumptive liability provision. In sum, it was critical that presumptive liability language be eliminated from the House bill. FEMSA member companies were encouraged to reach out to their Representatives and Senators with concerns about H.R. 2700, and the drastic impact it would have on their businesses. Section 3(e) of H.R. 2700 would pre-empt state negligence laws and establish a rebuttable presumption of liability applicable only to manufacturers of firefighting equipment and clothing, and those manufacturers would be presumed liable in product liability action for harm suffered by any firefighter performing interior structural firefighting. The law would be applicable only if:

- the harm resulted from the use of equipment or clothing which left the control of the manufacturer after the date of enactment of the bill; and,
- the equipment or clothing did not comply with the OSHA fire brigade occupational safety and health standard or a state standard more stringent than the OSHA requirement (and the equipment or clothing was provided for use in the state in which the state standard is in effect).

While these conditions made the legislation appear even-handed, the hard fact is that one needs the product to defend oneself. If the equipment or clothing were consumed in a fire, there would be no defense. In effect, it overturned the basic concept of American law that says one is innocent until proven guilty.

June 1989, 900 yards of black bunting was purchased (thanks to Morning Pride) and brought to the New York State Chiefs' Show. Most booths and apparatus were draped with black to demonstrate how manufacturers felt they would be affected if the presumptive liability provision were enacted into law. The same fabric was used at the New England and Maryland shows thereafter. Fire trucks with black bunting were also staged on the streets of Washington, D.C. near the Capitol, and at Washington National Airport, coupled with a hearse and powerful signage reading, "The Death of Small Business," "Product Liability is Killing US," and "We hope we'll be there when you need us."

Dateline: September 5, 1989 . . Filed with the State of Delaware, Office of the Secretary of State, a Certificate of Amendment to FEMSA's Certificate of Incorporation. The certificate amended the nature of FEMSA's business, objectives and purpose, to:

- operate as a business league as defined in Section 501(c)(6) of the Internal Revenue Code of 1954, for the improvement of business conditions in the fire and emergency services industry;
- advance and protect the business interests of member companies serving the fire and emergency services;
- improve and enhance trade shows and other forums for the exhibition of member products and services;
- elevate the standards for industry products and services and to promote the effective dissemination of information regarding such standards; and,
- promote reforms in the law to achieve these objectives.

The first set of association bylaws found in the association's legal/corporate records is dated as adopted in 1989. It appears this set served as the template for the current bylaws, although there have been modifications

through the years. Of note, in 1989, the number of Directors serving on the Board was 15; some years later it was reduced to 13; and the three Officers – President, Vice President, and Secretary/Treasurer – comprised the Executive Committee. Currently, there are five members of this committee that includes two Directors on the Board.

SENATE COMMITTEE ACTS ON LIABILITY BILL

FEMSA member Harry Featherstone (Will-Burt Co.) represented the National Association of Manufacturers (NAM) in presenting testimony to the Senate Commerce Committee during hearings on S. 1400 in April 1990. Featherstone said the impact of the current 50-state product system is "devastating." He outlined how product prices have increased, products have been discontinued, innovation has slowed, plants have closed, and thousands of American workers have lost their jobs or opportunities for new jobs. "We need S. 1400 in the U.S.A.," Featherstone said. "And we need it now, not later when more jobs are lost."

In May 1990, The Senate Commerce Committee completed action on S. 1400 and supporters of reform were urging all manufacturers to contact their Senators urging speedy action in the Senate Judiciary Committee to send a bill to the floor. FEMSA strongly supported this action, and the Administration, led by Vice President Dan Quayle, came out in strong support of the Senate bill. Remember, S. 1400 did not contain the presumptive liability provision affecting fire equipment and clothing that FEMSA fought in the House bill.

PRODUCT LIABILITY BILL DIES

Federal product liability legislation aimed at protecting manufacturers from facing a patchwork quilt of 50 different product liability laws died when Congress failed to act before adjournment in October.

S.1400, a bill strongly favored by the NAM and an alliance of large and small manufacturing interests, went all through the legislative process but didn't make it to a floor vote in the Senate before adjournment.

H.R. 2700, the House bill that singled out fire equipment manufacturers never even had a hearing during the 1989-90 Congressional session.

Leaders of the Coalition for Uniform Product Liability Law [FEMSA was a member] reported that key Senate co-sponsors of S. 1400 were on board with strategy aimed for 1991, and since the bill already had been through the Committee process, they were hopeful an early start would get results in the next Congress. More on that front to come.

Dateline: June 3, 1991 … Certified by the State of Delaware, Office of the Secretary of State, that the name of the association, "Fire Equipment Manufacturers and Services Association," is officially changed to "Fire and Emergency Manufacturers and Services Association," the name as it exists today.

1989 … marked the fall of the Berlin wall, the Cold War came to an end, the stealth bomber was completed, CFSI held the first National Fire & Emergency Services Dinner, and the new FEMSA held its first Annual Meeting in Orlando, Florida.

After transitioning from a social to a business organization in 1988, hard work was begun by a handful of professional business people who saw the need to put a new focus to FEMSA and the companies it represented. The first Annual Meeting in the fall of 1989 featured educational sessions on risk management, bar codes and a political education workshop. Following a reception, members were treated to riveting discussions on the costs to our society of product liability claims. "Unfortunately, there is no definition of how much security – safety – engineering – warnings – are enough, but the courts will be happy to tell you what

wasn't enough. Usually, it's whatever your programs did that wasn't enough," stated Harry Featherstone, setting the tone for a panel discussion of liability and risk management issues. Panelists recommended a number of areas where member companies needed to be vigilant.

Members of FAMA (Fire Apparatus Manufacturers' Association) met in conjunction with FEMSA's Annual Meeting allowing those companies that were members of both associations to attend both meetings, and enabling FAMA members to join FEMSA at the evening social functions.

"To build on the vitality we developed, we must broaden our program, involve more of our members, and ensure growing responsiveness to industry needs," noted FEMSA President Kit Cafaro. "We've identified goals for each committee that the Board voted to establish, appointed chairmen, and have invited all members to join in the work we face in the coming year and beyond," Cafaro stated.

The committee list was exhaustive and included: Awards (Steve Houchin, Super Vac); Bar Codes (Virgil Slagle, Slagle Fire Equipment); Congressional Fire Services Dinner (Ray Hawkins, VFIS); Disaster Register (Wayne Bennett, FireSoft); Ethics and Business Practices (Bill Barnes, Akron Brass); Finance (Harry Metcalfe, Vetter Systems); Goals (Kit Cafaro, MC Products); International Standards and Trade (Doug McMillan, Task Force Tips); Legislative (Roger Hannay, Hannay and Sons); Membership (Lila Gillespie, Electrosonics International); Nominating (Mary Grilliot, Morning Pride Mfg.); Overweight Truck Project (Bill Bruns, Grumman); Program/Education (Mary Grilliot, Morning Pride); and Trade Shows (Bob Barraclough, Span Instruments). Volunteers were then sought to work with committee chairs to engage actively in FEMSA.

Implementing recently adopted bylaws, the size of the FEMSA Board was expanded to add to the association's leadership. FEMSA members elected:

Officers:

President: Kit Cafaro (MC Products)
Vice President: Mary Grilliot (Morning Pride Mfg.)
Treasurer: Lila Gillespie (Electrosonics International)

Directors:

Bill Bruns (Grumman Emergency Products)
Ron George (Red Head Brass)
Art Glatfelter (VFIS)
Steve Houchin (Super Vac)
Harry Metcalfe (Vetter Systems)
Tony Testa (Ranger Fire Apparatus)
Bill Barnes (Akron Brass)
Bob Barraclough (Span Instruments)
Paul Darley (W.S. Darley)
Tony Parrino (Fire Chief Magazine)
George Freese (Globe Mfg.)
Bruce Guard (Elkhart Brass)

FEMSA accepted an invitation to join the Technical Advisory Committee of the National Oversize/Overweight Truck Permit Project. Funded by the Federal Highway Administration, the project would develop a uniform permit that individual states could issue for oversize and overweight truck shipments. The project also aimed to enhance interstate trucking operations. Bill Bruns represented FEMSA in this effort.

1990 … the Hubble Telescope was launched into space, Nelson Mandela was freed, the United States invaded Nicaragua, U.S. President Bush announced that he doesn't like broccoli, and federal product liability legislation aimed at protecting manufacturers from facing a patchwork quilt of 50 different product liability laws died when Congress failed to act before adjourning in October. A new bill would be introduced in both the House and Senate in 1991, and it was expected the Senate bill would be the model for the new legislation.

A proclamation declaring the week of October 7-14 as National Fire Prevention Week was signed by U.S. President George Bush. FEMSA Board members in attendance for the ceremony at the White House included Kit Cafaro, Bruce Bowling, Bill Bruns, and Ray Hawkins.

FEMSA's 2nd annual membership meeting was held in November in Orlando. The full agenda of programs included trade, industry developments, and small business concerns. The business meeting updated members on FEMSA's efforts to develop a liability insurance program, a legislative conference, and export day in Washington in the next year. Due to its extended growth, activities, and the need for financial stability, members were assessed $100 to offset basic association expenses. Several members donated over and above the assessment.

1991 … The Soviet Union ended, Princess Diana and Prince Charles separated, the World Wide Web was made available, and S.640 is introduced as the new focus for supporters of federal product liability legislation.

With strong bi-partisan support, Senators Jay Rockefeller (D-WV) and Robert Kasten (R-WI) introduced The Product Liability Fairness Act in March; it was identical to S.1400 which passed the Commerce Committee in 1990. It did not single out any industry and did not include the presumptive liability provisions contained in a House bill in the prior Congress that concerned FEMSA members. This bill was good news for manufacturers as well as distributors. FEMSA members were encouraged to write their Senators seeking co-sponsorship of S.640. In October, the Senate Commerce Committee voted 13-7 to support S.640. This vote was identical to the vote taken on the same bill in the same committee in 1990. With 13 more months before Congress would adjourn, there was sufficient time to get the bill to the Senate floor.

Union firefighters from Sioux Falls, South Dakota, found a sponsor for a presumptive liability bill. S.193 applied to apparatus, equipment and protective clothing, but it was killed quickly thanks to FEMSA's speedy response. FEMSA and FAMA were represented at a Senate Commerce Committee hearing by a South Dakota attorney who had represented FEMSA the prior year. Harold Boer (Central States Fire Apparatus) testified for the state Business & Industries Association, and a representative of the insurance industry opposed the bill. Steve Reedy (Luverne Fire Apparatus) got hold of a sheet of paper distributed at the hearing by supporters of the bill which indicated that several manufacturers listed were now supporting the bill. That list destroyed their credibility. Can you imagine companies like Morning Pride, Globe, MSA, Survivair, or Lion Apparel supporting presumptive liability? FEMSA staff immediately faxed the list to all FEMSA members named. By return fax, the message went out to South Dakota that the list was a farce. "We did not know such a bill existed and have not indicated our support. Now that we have read the provisions we strongly oppose this bill," noted one member company.

The Committee killed the bill and observers in South Dakota believed it would be a long time before supporters got anywhere in that state.

FEMSA's 3rd Annual Meeting held jointly with FAMA in Orlando in November attracted 100 attendees, the largest meeting to date.

1992 … Hurricane Andrew hit Florida, Quebec voted to remain part of Canada, Johnny Carson leaves the Tonight Show, and there's movement on product liability legislation.

In spite of substantial bipartisan support, key Senate leaders continued to block and stall the reform movement throughout the 102nd Congress … until Senators Kasten and Danforth announced that S.640 was of such importance to the manufacturing community that they would circumvent the committee process and offer the bill as an amendment to unrelated legislation – the Motor Voter Bill – which had a high priority for the leadership. Senate leaders attempted to secure the 60 votes needed to invoke cloture – and shut off further debate. That would have immediately prevented consideration of S.640. They fell one vote short of the 60 votes needed; thus, victory for the Product Liability Legislation supporters! Two days later, Democratic leaders were able to secure passage of the motion to table S.640. Senator Kasten reminded industry representatives that unlike some other legislative debates, "we have an organized, monied, powerful, successful lobbying force against us – the trial lawyers' lobby." The 61,000-member Association of Trial

Lawyers of America made defeat of product liability a top priority. Knowing how the Senators voted provided important information to prepare for the next vote.

FEMSA members staged "fly-ins" to Washington, DC, meeting with representatives and Senators, working with the National Association of Manufacturers, and testifying before Congress. In September, supporters of S.640 lost a critical vote in the Senate despite heavy lobbying by the NAM and FEMSA members from 32 states. Sixty votes were needed to invoke cloture in order to end debate and move on with the vote on legislation; only 58 votes were cast in favor of cloture and 39 against. The close vote showed increased support for product liability reform, reflecting years of consensus building and communications efforts on the part of coalition members. The voting trend indicated it would be passed the next year at long last.

The FEMSA/FAMA Annual Meeting was held in early October in Ft. Lauderdale, FL. A three-night package for attendees was $324 (hotel room for 3 nights plus breakfast each morning, tax and gratuities). The meeting focus was managing for quality performance.

Mary Grilliot is named FEMSA President, with Kit Cafaro serving as her Vice President.

1993 … The World Trade Center in New York is bombed, Lorena Bobbitt is tried in court, the final episode of *Cheers* is aired, and hearings continue on the latest Product Liability Fairness Act – S.687 … not passed in this session. Efforts continue.

FEMSA initiated efforts to produce a FEMSA Video Buyers' Guide, enabling the association to take advantage of this then-future-oriented method of marketing products. As a product-driven industry, the video format had the potential of reaching more firefighters than any other mechanism. The video would include a message that end users should buy from FEMSA members, and stressed the association's Code of Ethics.

The Annual Meeting was held in Tucson, AZ at the El Conquistador Resort. Speakers focused on "how-to" issues including customer service, employee relations, trade show effectiveness, video marketing and low-cost marketing techniques. FEMSA officially launched the new FEMSA Video Buyer's Guide at this meeting and obtained commitments from member companies to participate. Planned release was for the spring of 1994 at the FDIC. The meeting location was so well received – highest attendance to date – that the 1994 Annual Meeting was booked before the meeting events concluded.

1994 … Los Angeles suffers a massive earthquake, Jackie Kennedy Onassis and former President Richard Nixon died, NAFTA was signed by Mexico, America, and Canada, and the heat is turned up on product liability legislation.

FEMSA continues its growth with a strong 150 member companies. Highlights of the year included the Annual Meeting program producing a roundtable discussion on the duty to warn and product liability, trade show management, educational programs, and the future of the fire service. The meeting brought together representatives from a cross-section of member companies, and was an excellent networking opportunity.

The Video Buyer's Guide project was a good investment for the association as it gave FEMSA great exposure and resulted in new members.

Firehouse Expo received the most improved show award.

Efforts continued to develop a FEMSA-sponsored insurance program for the fire service industry.

The ISO Consortium was successful in achieving the goal of getting the international community to accept U.S. levels of performance, thereby enabling U.S. companies to compete globally. This was one of the more successful programs sponsored by FEMSA.

1995 … Craigslist and Yahoo! are founded, O. J. Simpson jury delivers "Not Guilty" verdict, Nelson Mandela is elected President of South Africa, and Product Liability Reform sees light!
"It was a long time coming – over 13 years!" reported FEMSA Legislative Committee Chair Roger Hannay (Hannay Reels). Now comes the hard task of working out a compromise between the more comprehensive version in the House and the narrower version in the Senate. And then there is the President's potential veto.

But this is the best shot we've ever had at product liability reform and maybe something can be worked out. More to come.

Fire Service Warning Label Crisis: In May, representatives from 25 companies in the fire and emergency services industry met in Atlanta to discuss the future of warning labels. To date, over 75 firms have indicated they want to have more detailed information about the FEMSA warning label project. With the NFPA backing away from warning labels, FEMSA must now consider developing its own warning label to provide manufacturers in this industry with a defensive shield. The consensus of attendees was to proceed to the next step in development – to distribute a prospectus to all companies with products or services in this industry to generate commitments for funding the warning label effort. Approximately $100,000 was needed to complete the work that several FEMSA member firms have initiated and are willing to donate to the effort. "We are at a crossroads with NFPA. This is another impact of product liability suits. We have to come up with our own warning label and user guide to protect our members," commended President Mary Grilliot.

Initial review of product warning labels and user information guides began in the summer. The review team looked at the state-of-the-art of warning labels for protective clothing. Next up for review would be fire apparatus followed by rescue tools – and so on – until the team has reviewed all products represented by participants. The prototype FEMSA warning label was unveiled at the Annual Meeting for attendees to critique.

FEMSA's Insurance Program also kicked off at the Annual Meeting, and the #1 Booster Award for 1995 was presented to Mary Grilliot (Morning Pride) in recognition of her leadership efforts on behalf of the fire service industry.

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https://www.femsa.org/whois_femsa/committees/

- **In 1997, FEMSA manufacturers of personal protection ensembles (PPE), in cooperation with legal counsel, technical authorities, and fire service groups, developed guides that replaced old NFPA warning labels for NFPA-certified products. Guides are provided with garments, helmets, footwear, gloves and hoods sold to first responders to educate them on the hazards of their profession and warnings on the limitations of PPE products.**
- Guides are updated when changes to NFPA 1971 and related standards are adopted.

Chair: Don Welch
Board Liaison: Rick Singer

This is also a topic of discussion DURING the 1996 NFPA Report of Committee. At that time Mr Griliott, REPRESENTING HONEYWELL, as a voting member of the NFPA 1971 PPE committee discussed the matter in great detail:

See page 2 of 231 https://www.nfpa.org/Assets/files/AboutTheCodes/1971/1971-F1996-ROC.pdf

Technical Committee on Fire Service Protective Clothing and Equipment

Mr. Grilliot (voting member / Morning Pride/HONEYWELL) voted negatively stating:

"During the Technical Committee Meeting in San Francisco, I believed that the Technical Committee had voted to delete ALL specific w:u[ting'requirenlents and only require that "a warning label" be attached to the product. We had problems with that decision, but the Conmlittee seemed to have formed a consensus. I had planned to w)te for the ROP so the document would not be delayed, and address any of our remaining warning concerns through the public comment process.

However, my review of the 1971 ROP reveals all specific warning requirements were NOT deleted (only the warning label language was) and that creates, I believe, literally an "industry stopping" crisis.
1. Specifically, paragraph 3-1.3.5 (and corresponding paragraphs for non-garment items) requires:

"The garment manufacturer shall integrate applicable warnings identifying risks and consequences into the user information where appropriate, such that the user understands that conformance to the instructions will mitigate the risk and consequence."

There are obvious problems that make this requirement absolutely impossible to meet for even the most diligent manufacturer:

(a) How c:m the manufacturer be held accountable for insuring "the~ user understands"? You can lead a horse to water, hilt you can't always make him drink.
(b) How could the manufacturer identify all (that is how how strict liability law defines "where appropriate') potential risks?
(c) How many potential consequences are there for even one risk?
(d) Given the above, how could a third party test lab certify a manufacturer met this requirement?

But these obvious problems are not the only problems with the retention of paragraph 3-1.3.5 (and similar paragraphs for non garment products); its retention is a true Catch 22 situation for the fire service.

The easiest way to explain is through the use of an exampe. Let's suppose in spite of his most diligent efforts, a manufacturer fails to anticipate a risk. For instance, let's suppose a firefighter is injured in a freak manner such as a plane of glass falls three stories onto him, causing severe injury. It is inarguable that falling glass was a risk, since the injury HAS occurred. Since the manufacturer failed to warn of a risk, his garment did not meet NFPA 1971 (because of the requirements of paragraph 3-1.3.5 that risks must be warned of).
Failure to meet the requirements of a national standard is DEFACTO proof of product defect in most US legal jurisdictions.

If we can't, anticipate all risks, ...if paragraph 3-1.3.5 requires we must do so to meet the national standard, ...and if US Law makes us de-facto poroduct defective when we don't meet the national stand,arE HOW COULD ANY RATIONAL FIRM CONTINUE TO MANUFACTURE FOR THE FIRE SERVICE?

2. Also, we found another surprise that somehow just appeared (nut discussed in Tech Committee), in paragraph A-3-1.1. Among other things it says:

"The first premise in providing adequate warnings is to understand that NO warning will remove or dilute a manufacturer's" obligation to adequate~ warn, nor protect the manufacturer from liability. The're are many experts " __, and for every~ there can be a differing "opinion on warning adequacy ~. The warnings are not, therefore, intended to remove liability."

Review the Appendix handed out in San Francisco, this was not part of the document at the close of that meeting.
Were did this come from? Who is writing this standard?

This wording almost invites litigation, since it states some expert will find any label inadequate and the manufacturer is liable. Then A-3-1.3.5 goes on to provide an incredibly demanding lanndry list of requirements for the label (to which manufacturers will be held accountable) without providing guidance on how to accomplish same:

- label must be "unavoidably obvious" so the user "cannot avoid noticing iF

- label should be "clear and qe catching" and ~ concise"

- label should "establish the risk or hazard, establish the consequences of exposure, establish safety precautions needed to mitigate or remove the consequences."

- etc.
It is impossible lbr even the most diligent manufacturer to meet all these requirements (everty user must notice the label, establish all risks, consequences and safety precautions, etc.).

3. Legal Opinion

Granted just as the deletion of warning label language helps shield the NFPA organization legally, these paragraphs (3-1.3.5 and A-3- 1.1) offer for want of a better term "the remaining shield". In other words, NFPA has avoided legal exposure as to the adequacy of warning label language by now not requiring specific language. But, in our counsel's position, NFPA had a remaining minimal legal exposure where a firefighter was hurt because his new NFPA garment did not have a warning that was previously required by the Standard (before NFPA's decision to'delete specific warning language) and which warning (if present) would have prevented his injury. Paragraph 3-1.3.5 allows, again in our counsel's opinion, NFPA the "shield" of being able to say,

"Wait, NFPA is not liable even though we deleted that specific warning requirement since paragraph 3-1.3.5 requires the manufacturer to warn of risks. If he didn't warn of a risk, his product does not meet the Standard and we are not involved."

But, in our opinion, ... the shield against a minimal risk to NFPA comes at a terible price: the paralysis of the American Fire Manufacturing Community. Will this situation make firms with all their assets safely beyond our national boundaries (and thus less available to the courts in the case of DE-FACTO judgements arising out of unanticipated risks) the only firms logically able to product f)r the fire service. Would this service the interests of the fire service?

In Smnmary

retention of paragraph 3-1.3.5 (and similar paragraphs for other products), the inclusion of A-3-1.1, combined with the deletion of specific warning label language is such a terrible disservice to the fire service, that I feel the only morally right voted on this issue is a negative vote. While I regret this may delay the document six months (of others vote negatively); I believe that is a small price to pay for correcting such a critical mistake. I am uncomfortable leaving the correction to the public comment period since this particular issue is one that seems to have a life of its own; originally, the issue of requiring manufacturers to warn of all risks was inserted into ALL open documents WITHOUT COMMITTEE DISCUSSION before the Austin meeting. The change in position was attributed to the rope task group but the rope task group and the full Technical Committee voted to delete the wording,
presumably, because they understood the impossible (~tch 22 the requirement imposed on fire service manufacturers, but it is now back. Similarly, we brought the issue up in San Francisco and understood "that all specific warning requirements were to be deleted", that would (at least, in my opinion) have included deleting specific warning requirements of 3-1.3.a and preventing insertion of A-3-1.1, but it did not.

If we let this document go into public comment, and there are similar misunderstandings as these which lets the requirement st~md (perhaps even after a vote to the contrary) --we will have an issued document that precludes rational firms from making product for the fire service!

DuPont is a member of the FEMSA, as well as Honeywell. I do not know what year either manufacturer joined FEMSA. But, as you can see by the timeline provided on PFOA/PFOS and DuPont, is that while sitting on NFPA, DuPont was aware of the concerns of PFOA. DuPont had the opportunity to advise anyone on the committees it sat on that there were concerns. They never did. Not once. It only came up this year in NFPA after the article from Station Pride titled 'The Real Cancer in Your Gear' came out in March of 2017.

If in fact there were 'warning labels ' in our gear, there may have been a discussion of the 'chemical additives' in our PPE to make it water resistant to pass NFPA 1971 standards. BUT, in their corporate greed, they protected themselves, while sacrificing us fo their shareholers, as they pat us on the back, smile at us, and wrap us in a blanket of security with their mega amounts of money in our ff caner research, ff caner studies, ff cancer symposiums.

This is a current list of the names of the turnout gear we wear. You'll find 'water repellent' names, also called 'coatings' and 'finishes'. All sound fine. But, these are all PFAS treated repellents for our gear. We are not allowed to know the chemical makeup, contents, or percent's of:

OUTER SHELLS

NOMEX® - Black, Yellow, Blue, Red, Tan, and White (DEFENDER™)
The plain weave fabric of Nomex® fabric, weighing approximately 7.5 oz/sq. yd. is treated with a water-repellent finish and can also be treated with an advanced water-repellent finish, "Super Shellite™".

ADVANCE™ - Black, Gold, Yellow, Khaki
Constructed of 40% Nomex®/60% Kevlar® blend fabric with a ripstop weave, weighing approximately 7.0 oz/sq. yd. The outer shell is treated with a water-repellent finish, "Shellite™" and can also be treated with an advanced water-repellent finish, "Super Shellite™".

BASOFIL® fabric – Yellow, Black, AuBrown (OMNI 45™ or BARRAGE™)
Constructed of 40% Basofil®/60% para-aramid fiber with a ripstop weave weighing approximately 7.5 oz/sq. yd. The outer shell shall be treated with a water-repellent finish.

MILLENIA™ Natural color only
7.5 oz/sq. yd. "Millenia™" (40% Zylon®/60% Technora®) with "Super Shellite™" finish.

XT MILLENIA™ Available Jan. 2007

PBI Gold and Black (KOMBAT™ – PBI Gold Plus®)
Constructed of 7.5 oz/sq. yd. 60% Kevlar®/40% PBI with a ripstop weave. The outer shell is treated with a water-repellent finish, "Shellite™" and can also be treated with an advanced water-repellent finish, "Super Shellite™".

ADVANCE ULTRA™ - Natural
Its unique patented construction, engineered from a blend including DuPont™ KEVLAR® brand fiber, provides superior strength, durability and thermal protection that stands up to the heat. Better strength (tensile and tear) after thermal exposure, better abrasion resistance and excellent thermal protection."
ADVANCE ULTRA™ available in Natural, Black Gold and Yellow.

GEMINI ™ or PBI Gold Plus with Matrix® Technology – Natural (Gold) and Black
Constructed of 7.5 oz/sq. yd. PBI/Kevlar® spun yarns reinforced with a network of Kevlar® filaments treated with an advanced water-repellant finish, Super Shellite™.

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In this document provided by the Fluoride Action Network, you may view the timeline of PFOA/PFOS events. When I view these events, I am appalled at what was not told to our NFPA committee members.
http://www.fluoridealert.org/wp-content/pesticides/effect.pfos.class.timeline.htm

If there were warning labels with the chemical content provided, a firefighter could have made the choice for themselves if they wanted to wear this garment for years while their bodies heated up, sweat, and toxins permeated their gear into their skin. They were not given that opportunity. We will never know how much we have lost by not knowing what was in our gear.

1938	Teflon discovery	Dr. Roy J. Plunkett discovered Teflon by	Ref.

		accident in 1938 as a result of a failed experiment involving refrigerator coolant. The waxy substance proved to be the most slippery material in existence.	16
1949	DuPont introduces Teflon	[Plunkett] began working for DuPont Jackson Laboratory in Deepwater, N.J., as a research chemist in 1936. Plunkett's discovery was found to be both heat-resistant and stick-resistant. After 10 years of research, DuPont introduced Teflon in 1949.	Ref. 16
1951	Washington Works plant begins using C8	DuPont begins using ammonium perfluorooctanoate, also called C8, to make Teflon and related polymers at its Washington Works plant near Parkersburg, W.Va. The chemical is produced by Minnesota Mining and Manufacturing, or 3M.	Ref. 2
1954	C8 toxicity	DuPont employees express concerns about the toxicity of C8.	Ref. 2
1956	3M begins selling Scotchgard Protector	Scotchgard Protector contained a fluorochemical that helped it repel stains.	Ref. 27
1962	FDA approval for Teflon cookware	Food and Drug Administration, which granted final approval to Teflon cookware in 1962	Ref. 4
1967	FDA approval of Zonyl for use in food packaging	In 1967, the FDA approved Zonyl, DuPont's leading brand of fluorinated telomers, for use in food packaging. It was a less costly and less labor-intensive alternative to the waxed-based papers previously used, which could not be recycled ... EPA officials have said they think Teflon and fluorinated telomers could be a source of C-8 in the environment.	Ref. 3
1968	Taves finds two forms of fluoride in human serum	Taves DR (1968). Evidence that there are two forms of fluoride in human serum. Nature. Mar 16;217(133):1050-1. *Excerpts:* It has been assumed that there is only form of fluoride in serum, the inorganic F ion. It would therefore seem that either the value for serum fluoride which I found (1μM) (refs. 1 and 2) or that found by Singer and Armstrong (7.5μM) (ref. 3) must be in error. While the diffusion method of Singer and Armstrong has been shown to produce erroneous values, the same cannot be said for their ashing and distillation procedure... Preliminary data on the distribution of the extra fluoride in serum are shown in Table 2. The morinthorium regent was used to measure the fluoride after diffusion at 25° C either directly or after ashing. xtra fluoride seems to be associated with the albumin and cannot be	Ref. 4A

		ultrafiltrated. Concentrating the serum proteins concentrated the extra fluoride in proportion. These results are consistent with the hypothesis that there are two forms of fluoride in serum, exchangeable and non-exchangeable. In 1950, Smith, Gardner and Hodge (5) found normal values of 1.7 µM for serum fluoride in a fluoridated community, implying that they also were measuring only exchangeable fluoride. They distilled fluoride from blood with H_2SO_4 at 135º C and then ashed the distillate (6). If in fact there is a non-exchangeable fluoride in serum, it did not break down or diffuse under these conditions, implying a large stable molecule. These findings are consistent with the presence of a fluorocarbon molecule. There seems to have been very little consideration of this possibility in any biological work. Peters' found that fluoroacetate is synthesized by certain toxic plants, but that it is not a general phenomenon. His work, however, leaves open the possibility of other forms of organically bound fluorine. 1. Taves DR (1966). Nature, 211, 192. 2. Taves DR (1967). Nature, 215, 1380. 3. Singer L, Armstrong WD (1960). J App Physiol, 15, 508. 5. Smith FA, Gardner DE, Hodge HC (1960). J Dental Res 29, 506 6. Smith FA, Gardner DE (1951). J Dental Res 30, 182.	
1970	The U.S. Environmental Protection Agency is created		
1976	Taves & Guy detect PFOA in pooled blood	Waldbott GL, Yiamouyiannis J (1977). Sepecial report. AAAS Fluoride Symposium in Denver. Fluoride, 10(3):141-4. July. *Excerpts:* ... W.S.Guy of Children's Hospital, Cincinnati, Ohio, stressed the need for differentiating between inorganic and organic fluoride in human plasma. In conjunction with Taves [see 1968 (Taves) above] he had isolated in 1976 by spectroscopic analysis, perfluorooctanoic acid, a major component in pooled plasma which accounts for at least 1/3 of the total organic fluoride content. This compound reaches the blood stream from the use of such products as floor waxes, wax paper, Scotch Guard, and other items. Along with Taves, Guy suggested that fluoride determinations by	Ref. 4B

		methods of Armstrong and Singer are inaccurate and that the blood levels of fluoride correlate much more closely with fluoride levels in drinking water than has been previously reported. The levels of organic fluoride, however, were not related to the content of inorganic fluoride in drinking water. He suggested that in infants fluoride supplements amounting to 1/2 g daily are excessve. He also discussed the fetoplacental barrier for fluorides...	
1978	C8 detected in workers blood	3M reports that C8 is detected in the blood of its workers. DuPont is "disturbed" that C8 might be causing "toxic effects" among employees at the Washington Works plant. The information is not shared outside the company.	Ref. 2
1980	DuPont determines continued exposure to C8 is not tolerable	Additional study by 3M confirms that C8 is toxic to rats and monkeys. DuPont determines that "people accumulate C8" and "continued exposure is not tolerable." The company begins sampling workers' blood for C8.	Ref. 2
1981	Published study found that rats fed fluorinated telomers metabolized them into C8	As early as 1981, a 3M study published in the journal Analytical Biochemistry found that lab rats fed fluorinated telomers metabolized them into C-8. A 3M test completed a year ago, after 3M had withdrawn from the business, showed that microorganisms in wastewater sludge broke down fluorinated telomers into C-8.	Ref. 3
March 1981	Eye defects found in rat study	A study by 3M links C-8, a key ingredient in Teflon, with eye defects in rats. DuPont transfers female workers out of its operations where C-8 is used.	Ref. 1
May 1981	2 babies of workers born with eye-related birth defects	May 1981 DuPont detects C-8 in the blood of five employees who had given birth in recent years. Two of their babies had eye-related birth defects.	Ref. 1
March 1982	More studies show no link to birth defects	After studies by DuPont show no link between C-8 and birth defects in rats, DuPont moves women of child-bearing age back into C-8-related work.	Ref. 1
1982	Concern about exposure of DuPont's emissions to local community	DuPont's director of employee relations recommends that all "available practical steps be taken to reduce this (C8) exposure because," among other things, "all employees, not just Teflon area workers are exposed" and "there is obviously great potential for the current or future exposure of members of the local community from emissions leaving the plant perimeter."	Ref. 2
Early 1980s	A DuPont employee who volunteered to donate blood	When an employee volunteered to donate blood at the DuPont's Wasington Works plant's	Ref. 2

	was turned away because of C8 in his blood	medical office, "the nurse shook her head and turned him away. His name was on a list of employees whose blood was contaminated with ammonium perfluorooctanoate, a chemical known within the company as C8."	
1984	DuPont finds C8 in local drinking water	DuPont sends employees to obtain drinking water samples from taps near Washington Works. C8 levels in the water are as high as 1.5 parts per billion in Lubeck, W.Va., and 0.8 parts per billion in Little Hocking, Ohio, where drinking water is drawn from wells across the Ohio River from the plant.	Ref. 2
1984	Dry Run Landfill opens	The 17-acre Dry Run Landfill, about 4 miles southwest of the community of Lubeck, is at the center of a major controversy over C8. Since the dump opened in 1984, DuPont has disposed of large amounts of C8-contaminated wastes in the facility. Company tests have confirmed that C8 is leaching from the landfill into Dry Run Creek at levels above the company's internal limits.	Ref. 28
1986	Teflon-based Stainmaster to protect carpets for sale.	DuPont begins selling the Teflon-based Stainmaster to protect carpets.	Ref. 27
1987	DuPont's chief toxicologist states accectable level of C8 in workers blood is 500 ppm	In 1987, DuPont's chief toxicologist said the acceptable level of C8 in the blood of workers was 500 parts per billion. A July 7, 1987, memo stated that employees whose C8 blood levels were half that "will be required to be removed from the exposure." ... DuPont never established an official limit for C8 in blood. Company scientists decided one wasn't needed, Rickard said. "There was no need to set an action level because there are no known human health effects."	Ref. 5
1988	DuPont buys Lubeck well field in West Virginia	DuPont buys the Lubeck well field next to Washington Works for $2 million and helps drill new wells 2 miles downriver.	Ref. 2
1991	Dupont established a "community exposure guideline" for C8	DuPont establishes a "community exposure guideline" of 1 part per billion for C8 in drinking water. The company continued to cite the guideline in internal documents as recently as November 2001.	Ref. 2
1996	DuPont agreed to pay $200,000 in fines and upgrade its Dry Run Landfill	The fine was to resolve complaints that pollution from the dump was killing area cattle and deer.	Ref. 25
1998	3M reports to the EPA that low levels of fluorochemicals are widely present in humans based on tests of blood-bank samples.		Ref. 27
1999	DuPont dumps 55,000	DuPont dumped 55,000 pounds of C8 into the	Ref.

	pounds of C8 into Ohio River	Ohio River during 1999.	2
July 1999	The Tennant's sue DuPont alleging C8 disposal in landfill near their farm caused cattle to die.	In the early 1980s, DuPont purchased hilly parcels of West Virginia land owned by brothers Wilbur Earl, Jim and Jack Tennant. In 1984, the company began dumping waste containing C-8 into an unlined landfill in one of the hollows, records show. ... The Tennants sued DuPont in July 1999, alleging several hundred cows died after drinking from streams and ponds near the landfill. DuPont settled that case in 2001. Details are confidential, but more than 100,000 pages of company documents disclosed in that lawsuit became the basis of a class-action lawsuit certified last year on behalf of Ohio River Valley residents.	

ctober 2000	DuPont reaches an out-of-court settled with the Tennants Note. other papers have reported the settlement was made in 2001.	DuPont reaches an out-of-court settlement with a West Virginia farmer who filed a lawsuit claiming that C8 killed his cattle and sickened his family.

August 2001	Attorneys file Class Action	Attorneys file a class-action lawsuit on behalf of West Virginia residents exposed to C8.

October 2001	Consent Decreet between DuPont and West Virginia - Levels of C8 above 14 ppb in drinking water would trigger DuPont to provide alternative sources	An October 2001 consent decree between DuPont and the EPA's West Virginia and Ohio regional branches specified DuPont would have to provide temporary alternative sources of drinking water should concentrations of C-8 be found at or above 14 ppb in ongoing testing in the region. The level, since raised to 150 ppb, has been criticized by the Environmental Working Group.

November 2001	West Virgina and DuPont sign a Consent Order	West Virginia and DuPont sign a consent order requiring another study of the potential health hazards posed by C8

anuary 2002	Little Hocking Water Assoc. in Ohio find their water supply is contaminated with C8	Officials from the Little Hocking Water Association find out for the first time that their water supply is contaminated with C8.	Ref. 2

		The West Virginia Department of Environmental Protection concludes that C8 in drinking water presents "possible health risks to the public" and that C8 "has been linked to possible health problems related to long-term exposure."	
March 2002	DuPont completes $50 million expansion of its Teflon business	DuPont completes a $50 million expansion of its Teflon business.	Ref. 1
March 2002	C8 detected 15 miles downriver	C8 is detected in the Tuppers Plains, Ohio, water system -- 15 miles downriver from Washington Works. Low levels of the chemical also are found in Pomeroy, Ohio, 70 miles downriver, and in the Belpre, Ohio, water system, 4 miles upriver from the plant. Experts conclude that smokestack emissions from Washington Works are causing some of the contamination. Under an agreement with the U.S. EPA, DuPont promises to reduce air and water emissions of C8 by at least 50 percent of 1999 levels by the end of 2003. The company also plans to install a system to remove up to 95 percent of the C8 in the plant's wastewater.	Ref. 2
March 12, 2002	DuPont agrees to provide alternative drinking water supplies if C8 levels are found to exceed 14 parts per billion.	US EPA Region III News Release: DuPont shall provide a temporary alternate drinking water supply for users of any private drinking water well and Public Water System in West Virginia or Ohio where such results show the level of C-8 exceeds 14 ppb.	Ref. 18
May 2002	Regulatory agences say 150 ppb of C8 isn't harmful to humans	A team of West Virginia, federal and private scientists convened by the state of West Virginia declares that water containing up to 150 parts per billion of C8 isn't harmful to humans. See comments from the Little Hocking Water Association that detail the history of the "safe level" in drinking water from 14 ppb to 150 ppb.	Ref. 2
September 2002	US EPA begins review of data that links C8 to health problems	The U.S. EPA begins a rare "priority review" of data that links C8 to health problems, the first step in a potential effort to regulate the chemical. The agency cites studies showing that "exposure to (C8) can result in a variety of effects including developmental/reproductive toxicity, liver toxicity and cancer."	Ref. 2
September 2002	West Virginia approves weak air-exposure level for C8	West Virginia regulators approve an air-exposure level for C8 that is three times weaker than the limit proposed by an agency consultant, who says the lower level "is more protective of public health."	Ref. 2
Sept. 2002	US EPA suggests potential for reproductive and developmental toxicity	EPA says new data suggest potential for reproductive/developmental toxicity, and that blood samples suggest unexplained exposure to general public.	Ref. 1

Sept. 2002	DuPont's CEO, coauthors a paper on Sustainable Development	Walking the Talk: The Business Case for Sustainable Development, coauthored by Holliday, is published.	Ref. 1
October 2002	DuPont begins manufacturing C-8 at a plant in Fayetteville, North Carolina.	DuPont started manufacturing C-8 in October at a plant in Fayetteville, N.C., for its own use and for sale. DuPont also has begun to dispose of C-8 waste along the Delaware River as part of its efforts to control the pollution problem on the Ohio River. DuPont officials said disposing of C-8 waste in Delaware waters poses no environmental risk.	Ref. 8
December 2002	Ohio EPA endorses safe level of 150 ppb in drinking water	In an internal memo, a top official at the Ohio Environmental Protection Agency endorses West Virginia's C8 "screening level" of 150 ppb in drinking water. "As a result, no adverse health effects would be expected to occur in populations using the contaminated water as a source of drinking water," the Ohio EPA memo concludes. See comments from the Little Hocking Water Association that detail the history of the "safe level" in drinking water from 14 ppb to 150 ppb.	Ref.

TIMELINE for 2003 - 2004			
March 2003	US EPA estimates that females are at an unacceptable risk from exposoure to C8	The risk assessment prepared by the EPA, dated March 17, estimates that health risks to young girls and women of childbearing age are higher than levels considered acceptable by the agency. The report did not address other C8-related health problems suggested by animal studies, such as cancer and liver damage... The report estimated that women of childbearing age and girls ages 2 to 12 have an average margin of exposure of 66. Any number below 100 is considered by the EPA to indicate an unacceptable risk.	Ref. 6
April 2003	Jude rules DuPont has to pay for medical testing for up to 50,000 people.	April 2003 In class-action against DuPont, a W. Va. judge rules C-8 is “toxic and hazardous to humans,” orders DuPont to pay for medical testing of up to 50,000 people. DuPont files petition to set aside the order.	Ref. 1
Reported April 5, 2003	Children found to have highest C8 levels in blood	EPA scientists are concerned about three studies conducted by 3M last year that found both the Scotchgard compound and the Teflon compound in human blood across the nation... Average levels of C8 detected in all three	Ref. 7

		studies were between 4 parts per billion and 5 parts per billion. The highest levels of C8 (56.1 parts per billion) were found in children, leading 3M researchers to speculate that children are exposed more frequently because they play on carpets treated with stain repellants. "We're still not sure how it's getting into people's blood," said Rick Renner, a 3M spokesman. None of the industry studies filed with the EPA identifies specific products made with the chemicals. However, a manual for researchers hired by 3M instructs them to prevent contamination of field samples by avoiding use of products -- including some packaging -- that contain perfluorochemicals. Examples in the manual include new clothing, water-resistant clothing, microwave popcorn, fast food, chicken sandwiches, french fries, pizza, bakery items, beverages, candy, cookies and candy bars.	
May 1, 2003	West Virginia Judge orders DuPont to pay for blood tests... and to pay costs for destroying documents	A West Virginia judge has found that a chemical used to make Teflon is toxic and has punished DuPont for destroying documents as it defends itself in a class-action lawsuit involving the chemical. ... The latest ruling orders the company to pay for blood tests to measure exposure to ammonium perfluorooctanoate, also known as C8. The ruling also orders DuPont to pay the plaintiffs' attorney fees and other costs for delays in providing some company documents and destroying others. DuPont has until late May to appeal the ruling. Levels of C8 in the blood of people living near the plant could be 1,000 times higher than the general population, according to calculations based on a study DuPont published in 2001. The company now says the study was flawed. Judge Hill ruled the company should pay for blood tests to measure exposure levels. He also ruled that DuPont had ignored court orders to make records available.	Ref. 9
May 17,	DuPont files motion to	A motion from DuPont to block the	Ref. 10

2003	block release of medical records of their workers	release of certain medical records of employees beyond testing for the presence of C8 was filed in Wood County Circuit Court Friday afternoon. ... Friday's filing by the DuPont counsel is in response to an order filed Thursday where counsel for the plaintiffs asked Judge George W. Hill to force DuPont to turn over medical documents.	
May 28, 2003	Teflon coated pans emit toxic particles and chemicals within normal use on a typical stovetop, according to tests by the Environmental Working Group	Dr. Jennifer Klein, EWG chemist, tested a Teflon-coated pan's temperature using a precision infrared thermometer to determine how quickly the pan achieved enough heat to begin releasing fumes. "Our simple test showed DuPont is wrong when they tell customers the pans won't degrade except under extreme misuse. Actually, the pans started emitting toxic particles and chemicals quite quickly at temperatures within normal use on a typical stovetop," Klein said.	Ref. 11
June 1, 2003	Judge George W. Hill refuses to step down in class action lawsuit. Judge Hill orders DuPont to turn over medical records of their employees whose blood was tested for C8	A judge in Parkersburg, W.Va., refused to step down from a class-action lawsuit.. Wood County Circuit Judge George W. Hill lives in the area where the chemical was detected and could be a potential benefactor, DuPont said. ... Hill said residents of Parkersburg, where he lives, do not qualify for the class because testing of the city's water supplies revealed nonquantifiable traces of ammonium perfluorooctanoate, or C8. ... Also last week, Hill granted the plaintiffs' request that DuPont turn over medical records of employees whose blood was tested for C8.	Ref. 12
June 22, 2003	3M replaces C8 in Scotchgard with a C4 chemical.	... The replacement aerosol-can Scotchgard that 3M first distributed to stores didn't work as well as the original. It was based on non-perfluoro chemistry and worked on water but not grease. Nothing repels like perfluorochemicals, 3M concluded. The challenge was to find safe ones. 3M settled on perfluorobutane sulfonate, or PFBS, a four-carbon cousin of the chemical in the old Scotchgard, as the building block for Scotchgard's new generation. ``For providing protection you almost can't do it without a fluoro-chemical, short of plastic slipcovers,'' said Michael	Ref. 13

		Harnetty, vice president of 3M's protective materials division. The new C4-based Scotchgard is completely safe, 3M says. The company adds that it has worked closely with the EPA and has performed more than 40 studies, which are confidential. The EPA won't release them.	
July 2003	DuPont launches $20 million ad campaign featuring Teflon products	DuPont launches a $20 million ad campaign featuring Teflon products.	Ref. 1
Sept. 2003	DuPont argues in court to remove Class Action judge	Arguments are heard on motion by DuPont to remove judge from case. Trial is postponed.	Ref. 1
September 27, 2003	Mother in Class Action speaks of the developmental problem suffered by her young daughter: her teeth failed to develop properly.	... Debra Cochran of Pageville, a stay-home mother of three, has begun her own investigation into the substance, driven by fears about her family's health. News reports about C8 peaked her interest months ago and now she is trying to find out if the manufacturing chemical could be a contributing factor in a developmental problem suffered by her 6-year-old daughter, Lauren. "We thought her teeth came in without enamel," Cochran said. Lauren had to have her teeth removed after they failed to develop properly. Recently Cochran has discovered that several other families in her area have experienced the same problem...	Ref. 14
Oct. 2003	Dupont CEO honored at UN for ...	DuPont's CEO Holliday honored by U.N. Secretary General Kofi Annan for commitment to sustainable business.	Ref. 1
December 6, 2003	State Supreme Court overturns ruling that required DuPont to pay for blood tests for 50,000 people.	The state Supreme Court overturned a ruling yesterday that required DuPont to pay for blood tests for 50,000 people who claim a chemical used to make Teflon has contaminated their water supply. The 4-1 ruling overturned a lower-court order on behalf of residents who say their health has been affected by DuPont's use of ammonium perfluorooctanoate, also known as C8, at its plant in Wood County. The chemical company was not given proper notice that the residents were seeking the injunction, so the order is void, the high court said.	Ref.16
Reported in 2003	Long-term exposure to C8 "has not been directly factored into any risk estimation to date."	Long-term exposure to C8 concentrations of only 2 parts per billion in water -- the level detected in tap water provided to 12,000 customers of the Little	Ref. 5

		Hocking Water Association in Athens and Washington counties -- would lead to blood levels of 600 parts per billion, according to the DuPont model. Scientists who developed the model said the blood levels would be reached only after repeated exposure for more than six years. ... DuPont has known that Little Hocking's wells were contaminated since at least 1984, court records show. ... Long-term exposure to the chemical, Gray wrote, "has not been directly factored into any risk estimation to date."	
February 12 , 2004	US federal agency to study blood levels of residents in affected C8 Ohio communities	The four-year study is being funded by an $840,000 grant from the Environmental Justice Program of the National Institute of Environmental Health Sciences through the collaboration of the Decatur Community Association, environmental health researchers at the University of Pennsylvania School of Medicine and the Occupational Medicine Program of the HealthSouth Rehabilitation Hospital. Samples should begin to be collected by mid-2004, said Freeman. The 400 people chosen will be random, but must have lived in the area for at least four years. "There are studies being done now to determine where the highest levels, medium levels and lowest levels of C8 in the air are in this area," he said. "We want to randomly sample within those various regions."	Ref. 17
March 4, 2004	US federal agency to conduct 2-year study of young children's exposures in their homes to selected chemicals including Perfluorinated Chemicals. Docket No. ORD-2003-0011	Announcement: Longitudinal Study of Young Children's Exposures in their Homes to Selected Pesticides, Phthalates, Brominated Flame Retardants, and Perfluorinated Chemicals (A Children's Environmental Exposure Research Study--CHEERS). Abstract: The U.S. EPA's Office of Research and Development's National Exposure Research Laboratory proposes to conduct a two-year longitudinal field measurement study of young children's (aged 0 to 3 years) potential exposures to current-use pesticides and selected	Federal Register

		phthalates, polybrominated diphenyl ethers, and perfluorinated compounds that may be found in residential environments. The study will be conducted in Duval County, Jacksonville, Florida over a two-year period from 2004 to 2006. Sixty young children will be recruited into this study in two cohorts: (1) infants recruited into the study soon after birth, and, (2) children recruited into the study at approximately 12 months of age... See also: Part A: Supporting Statement - EPA ICR Number: 2126.01 - 61 pages	
April 30, 2004	DuPont to launch $1M C8 study	"DuPont Washington Works officials announced Thursday plans to conduct a $1 million study to compare the health of employees who work directly with C8 and those who do not. The company is asking all 960 of its employees at Washington Works to participate. Officials hope at least 750 will, said Paul Bossert, plant manager. Retirees and others who work at the plant for outside contractors will not be involved in the study, Bossert said... The examinations are slated to begin June 2 and will take about a month to complete ... DuPont has hired a private firm, Professional Health Services, Leachtown, Pa., to perform the survey. The protocol and results will be evaluated by two outside review boards, including the West Virginia University Institutional Review Board, said Robin Leonard, principal research epidemiologist for the DuPont Haskell Laboratory... During the examinations, the company will draw blood to test for serum levels of C8, and will provide urinalysis, pulmonary-function tests, chest X-ray and electrocardiograms. The study will focus on evaluating liver function ... The study would be more valuable if it used a control group who lives and works nowhere near where C8 is used, Deitzler said." [Deitzler is a lawyer representing the plaintiffs in the Class Action suit against DuPont]	Ref. 19
May 6, 2004	New study finds cancer rate higher in C8-exposed areas	A recently released study authored by Dr. James Dahlgren, a nationally known toxicologist retained by plaintiffs in a pending Wood County Circuit Court C8	Ref. 20

		class action lawsuit filed against DuPont Washington Works, states "the overall cancer prevalence rate is higher in the population exposed to C8 when compared to the general population." ...According to Dahlgren's report, the aim of the study "was to compare cancer distribution and cancer prevalence rates in a PFOA-exposed population (residents) to that of the industry cancer registry data from an occupational exposed population and finally to the general population. We performed a questionnaire on 599 residents living near DuPont Washington Works." ...The residents from age 24 to 65 have a significantly higher rate of prevalence cancer when compared to the general population," according to the study. "Our findings indicate that the exposed residential population (residents) have similar cancer prevalence findings to the PFOA exposed workers. Prostate cancer in the workers was proportionately elevated among young age males," the report states. The report also notes findings of elevated prevalence rates of atypical cancers such as Hodgkin's, Leukemia and Multiple Myeloma. This data suggest that exposure to PFOA may alter cancer distribution in exposed populations (worker and residents) and may be an important risk factor for an excess of cancer cases," according to Dahlgren's report...	
May 8, 2004	West Virginia Supreme Court orders DuPont documents unsealed in C8 suit	The West Virginia Supreme Court voted 5-0 Thursday to unseal the internal documents, which include a November 2000 memo written by in-house DuPont lawyer John R. Bowman that recommended "getting out in front and acting responsibly (to) undercut and reduce the potential for punitives." The ruling upholds a decision by the trial court judge... Another document unsealed Thursday, known as the "Win for DuPont" memo, said the company's goals were to "not create (the) impression that DuPont did harm to the environment" and to "keep (the) issue out of press as much as possible." ...	Ref. 21
June 24, 2004	EPA will conduct studies of C-8	The federal government will conduct its own scientific studies of a toxic compound now commonly found in	Ref. 22

		human bloodstreams after months of trying to get the chemical industry to agree on how testing should be carried out, an Environmental Protection Agency official said Thursday... The EPA wants to study how C-8 and related chemicals break down and reach the environment and living tissues. The agency said it wants several tests on 13 compounds, and would move to carry out its own studies or conduct parallel tests if talks fail to make progress by next month. ..	
July 7, 2004	Little Hocking Water customers needed for C8 study	An independent four-year study on the effects of C8 on Little Hocking Water Association Service District customers is set to begin this month. About 400 people will be asked in the following weeks to participate in the study by answering surveys and providing samples of blood and/or breast milk. Mailings are going out as early as today soliciting participants for the study. The main purpose of the study is to measure the levels of C8 in the bloodstream of a selected sample of residents who live in the Little Hocking Water Association District and if those levels are posing any health risks...	Ref. 23
July 8, 2004	EPA Takes Enforcement Action Against DuPont For Toxic Substances Reporting Violations	EPA's Office of Enforcement and Compliance Assurance (OECA) is taking an administrative action against E. I. DuPont de Nemours and Company (DuPont) for two violations of the Toxic Substances Control Act (TSCA) and one violation of the Resource Conservation and Recovery Act (RCRA). These violations consist of multiple failures to report information to EPA about substantial risk of injury to human health or the environment from a chemical during a period beginning in June of 1981 through March of 2001. Companies are required by TSCA to report such information immediately. EPA has the authority to seek a penalty of $25,000 per day for violations occurring before January 30, 1997, and up to $27,500 per day for violations occurring thereafter, for each day that DuPont failed to report the information. EPA alleges that DuPont did not submit to the Agency information the company had obtained regarding the synthetic chemical Perfluorooctanoic Acid (PFOA). PFOA is used in the manufacturing process for	Ref. 24

		fluoropolymers, including some Teflon® products, at DuPont's Washington Works facility in Washington, West Virginia... See also: US EPA vs. DuPont. Complaint and Notice of Opportunity for Hearing.	
August 12, 2004	DuPont's response to US EPA: "Answer and Request for Hearing."	Submitted by Thomas B. Johnston and Daniel E. Johnson of MCKENNA LONG & ALDRIDGE LLP (Washington DC) and Peter D. Robertson and John C. Martin (PATTON BOGGS LLP (Washington DC).	Ref. 26
September 8, 2004	DuPont Agrees to Settle Class Action Suit	DuPont agreed on Thursday to pay as much as $343 million to settle a class-action lawsuit alleging the chemical giant contaminated drinking water supplies in West Virginia and Ohio with a key ingredient of its Teflon product. * If approved, the settlement would fund a $5 million study into whether C8 causes disease in humans. If a scientific panel finds such a link, DuPont would pay up to $235 million -the bulk of the potential settlement- on medical tests of residents to monitor their health. • DuPont would spend another $10 million to remove as much C8 from the area's water supply as possible by building state-of-the-art water treatment plants in two West Virginia and four Ohio water districts. • The proposed settlement also includes $70 million that DuPont would pay into a fund to be overseen by a court-appointed administrator. At least $20 million of that would pay for health and education projects. Another $22.6 million of the potential settlement is earmarked for lawyers' fees and expenses.	

Also damaging is the intent of DuPont to acquire 'spin doctors' seeking to mitigate the PFOA issue as is documented in this 2003 letter from ' The Weinberg Group'.

https://www.documentcloud.org/documents/2289501-weinberg-memo.html

P1.7
1220 Nineteenth St NW
Washington. DC 20036- 2100

THE WEINBERG GROUP INC
April 29.2003

Jane Brooks
Vice President. Special Initiatives

DuPont de Nemours & Company
44 17 Lancaster Pike
Wilmington. DE 19805

Re: Pcrfluorooctanoic acid (PFOA)

Dear Ms. Brooks:

I am preparing this letter in anticipation of our meeting on April 29,2003 in Washington, DC.
This piece is intended to describe the services THE WEINBERG GROUP INC. can provide regarding issues related to perfluomhernicals generally and perfluorooctanoic acid (PFOA) in particular. Please note that this has been prepared prior to our initial meeting. 1 will most certainly follow up after our meeting with more specific ideas and recommendations after we have had the opportunity to discuss DuPont's concerns in greater detail.

The constant theme which permeates our recommendations on the issues faced by DuPont is that DUPOhT MUST SHAPE THE DEBATE AT ALL LEVELS. We must implement a strategy at the outset which discourages governmental agencies, the plaintiffs bar and misguided environmental groups from pursuing this matter any further than the current risk assessment contemplated by the Environmental Protection Agency (EPA) and the matter pending in West Virginia We strive to end this now.

For 23 years. THE WEINBERG GROUP has helped numerous companies manage issues allegedly related to environmental exposures. Beginning with Agent Orange in 1983, we have successfully guided clients through myriad regulatory. Litigation, and public relations challenges posed by those whose agenda is to grossly over regulate, extract settlements from, or otherwise damage the chemical manufacturing industry.

As we understand the situation, there is currently a great deal of attention focused on the safety of perfluorochemicals generally and PFOA inparticular. Specifically, due to the situation in West Virginia and the activities of Environmental Working Group, the threat of expanded

litigation and additional regulation by the EPA has become acute. In response to this threat it is necessary for DuPont to prepare an overall technical and scientific defense strategy. We can assist with all phases of the technical and scientific defense, but more importantly, shape the debate and direction of the PFOA issue. The recent ruling by Judge Hill regarding blood testing underscores the need to act quickly and forcefully. The following will describe some of our capabilities in assessing che scientific facts, developing appropriate responses or sound scientific messages. Building a team of world class experts to deliver those messages, and implementing a strategy to limit the effect of litigation and regulation on the revenue stream generated by PFOA.

DEVELOPMEST OF BROAD TECHNICAL DEFENSE STRATEGY

For over two decades, clients have repeatedly communicated to us that of all the services we provide,.the most valued is our ability to provide an overall science-based defense strategy. This strategy can be applied to litigation, regulatory, or legislative problems that cause a particular product to be under pressure. Specifically, during the initial phase of our engagement by a client, we will harness, focus, and involve the scientific and intellectual capital of our company with one goal in mind - creating the outcome our client desires. This will entail the coordinated and focused compilation of specialists within THE WEINBERG GROUP to receive, review, and analyze all available relevant data regarding PFOA in particular, and polyfluorochemicals in general. These in-house experts ye scientists and physicians holding advanced degrees in such areas as epidemiology & biostatistics, pharmacology, pathology, toxicology, oncology, molecular biology, regulatory suategy, and product defense.

The outcome of this process will result in the preparation of a multifaceted plan to take control of the ongoing risk assessment by the EPA, looming regulatory challenges, likely litigation, and almost certain medical monitoring, hurdles. The primary focus of this endeavor is to strive to create the climate and conditions that will obviate, or at the very least, minimize ongoing litigation and contemplated regulation relating to PFOA. This would include facilitating the publication of papers and articles dispelling the alleged nexus between PFOA and teratogeniciry as well as other claimed harm. We would also lay the foundation for creating Daubert precedent to discourage additional lawsuits.

THE WEINBERG GROUP would also prepare an all-encompassing strategy to meet public relations issues and. if necessary, prepare company representatives for testifying before governmental bodies. These are but a few of the services we provide.

It is also important to note that these services will not be duplicative of the services provided by law firms and public relations firms. Although we work closely with counsel and other consultants, our services are distinct and science-based.

Over the past thirty years, the perfluorochemical industry has amassed a plethora of scientific data on the safety of PFOA. Many in the industry are convinced, with good reason, that PFOA is safe. They would cite numerous studies and conclusions reached by a broad spectrum of scientists. All of h s is good, and certainly well intended, but the current litigation and regulatory climate demands a fresh new approach. In our opinion, it matters little that the industry is satisfied PF0A is safe. The real issue is the perception outside the industry. This battle must be won in the minds of the regulators, judges, potential

jurors, and the plaintiffs bar. The recent certification by numerous federal courts of medical monitoring classes as well as the organization, sophistication, and financial strength of the plaintiffs bar require an aggressive, relentless strategy be implemented and driven by the manufacturers.

Manufacturers must be the aggressors. A defensive posture, in our opinion, would be disastrous. THE WEINBERG GROUP can help DuPont take the lead on issues related to PFOA. We would suggest a multifaceted approach be implemented immediately.

WHAT WE DO

As the leading scientific consulting firm in the world, THE WEINBERG GROUP serves industries in four areas, the first of which is development, registration and support of pharmaceuticals, biologics, and devices. Other services deal with environmental, health and safety issues through the use of the latest information and techniques establishing risk levels and risk management techniques and organization of technical functions such as quality assurance and toxicological ,clinical and epidemiological studies. In the fourth area, we provide science-based advocacy to help deal with emerging business problems in litigation, legislation and regulation. Our staff has a broad base of experience supporting counsel and their clients in responding to demands for damages, punitive rewards, reimbursement and future medical monitoring costs for personal injury and fraud associated with drugs, corporate conduct, and failure to provide the correct information to the public or legislators and regulators. Specifically, in the area of Science-Based Advocacy, we assist with:

* analysis of plaintiffs' best c k and defendants' best response as a tool for strategy and tactic4 development:

* witness, spokesperson and panel identification and development in all issues in litigation;

* preparation of counsel for discovery, deposition, negotiation and trial;

* records review. analysis. and organization:

* preparation of primers describing critical issues and including approaches such as affidavits for use in summary judgement and opposition to class certification;

* document retrieval, management and analysis:

* unique development of experts with chemical, medical, epidemiological, biologics, regulatory, and legislative backgrounds;

* a variety of public relations programs needed to create jury understanding of the issues; and

* Creation of exhibits. audiovisual presentations, and other devices to enhance lay understanding of the issues in dispute, most notably the complex scientific concepts to be digested in defense arguments. U

Ours is a task-oriented organization in which clients make specific assignments under carefully planned, client-controlled budgets. Our experience in environmental exposure matters has repeatedly illustrated our client's need to control as many variables of liability exposure as

possible. In addition, some preliminary suggestions of tasks for managing issue related to PFOA include:

* develop "blue ribbon panels" of thought leaders on issues related to PFOA IN REGIONS WHERE MANUFACTURWG PLANTS ARE LOCATED to create awareness of safety regarding PFOA in areas Of likely litigation, and in particular where medical monitoring claims may be brought;

* develop an aggressive campaign focused on the safety and utility of PFOA and the products it in which it is used;

* coordinate the retrieval, organization, and analysis of literature to date (both internal and externall) regarding safety of PFOA and create a centralized searchable database for industry use;

* begin to identify and retain leading scientists to consult on the range of issues involving-PFOA so as to develop a premium expert panel and concurrently conflict out experts from consulting with plaintiffs;

* begin to coordinate focus groups of mock jurors to determine the best "themes" for defense verdicts and perspectives on management of company documents and company conduct;

* reshape the debate by identifying the likely known health benefits of PFOA exposure by analyzing existing data, and/or constructing a study to establish not only that PFOA is safe over a range of serum concentration levels, but that it offers real health benefits (oxygen carrying capacity and prevention of CAD);

* coordinate the publishing of white papers on PFOA, junk science and the limits of medical monitoring;

* work with industry lobbyists to ensure they remain on message regarding the scientific issues related to PFOA;

* provide the strategy to illustrate how epidemiological association has little or nothing to do with individual causation. and:

*begin to shape the Daubert standards in ways most beneficial to manufactures.

THE W E I N E R G GROUP has developed an understanding of the variety of approaches needed to deal with each of these issues. Indeed, we have trial experience in these issues as well.

Page 5

I want to reiterate that we already have extensive experience in helping a Fortune 40 client with a very similar compound to PFOA. Our experience and knowledge regarding this compound is very well established. We do not need to educate ourselves at DuPont's expense.

I again stress that this was prepared prior to our initial meeting but I wanted to provide material for you to ruminate upon before our next discussion on these issues. Thank you again for the opportunity to be of service.

Sincerely,
P. Terrence Gaffney. Esq.
Vice President
Product Defense

ALSO, in August of 2004, Dupont admits to LIVER TOXICITY in high amounts, and duration. Because they alone know the amounts, we were not allowed to protect ourselves.. we know the duration.. it can be hours every day during our shifts. DUPONT KNEW., as they preach/teach/support/fund every aspect of our FF Cancer interactions.

Item 9:

8. DuPont admits that the company's Washington Works facility has released PFOA into the air, treated waste containing PFOA in anaerobic digestion ponds, disposed of waste containing PFOA into landfills and discharged PFOA into the Ohio River.

9. DuPont admits that at high enough doses and durations of exposure, PFOA has been shown to produce liver toxicity in some test animals, and that at lower doses can produce such toxicity through a process known as induction of peroxisome proliferation. Humans, however, are not susceptible to peroxisome proliferation.

http://www.fluoridealert.org/wp-content/pesticides/pfoa.dupont.response.aug04.pdf

At this point in this letter to you all, I wish to add that DuPont's relationship with the fire service is very unique. In that DuPont financially supports our cancer research, DuPont

prints slick, glossy ads about firefighter cancer prevention, DuPont knows first hand about our bodies heating up and soaking in sweat laden toxins that penetrate the 3 layers of our PPE. DuPont knows about our temperature rising while we don 40 pounds of gear. DuPont knows our cancer rates, DuPont knows about firefighter cancer risks.

DuPont has sat on our NFPA for years and not once mentioned PFOA OR PFOS to us, or published at 'warning' or anything of that nature. All the while, this type of drama is being played out. I have no idea if DuPont went on to use this agency. I do know, they had the opportunity back in 2003 after this letter, to begin to explain to firefighters. In 2003 my husband was wearing Kevlar. Along with hundreds of thousands of other firefighters. We had the moral right to know.

Contrast what you have just seen in the DuPont Timeline, against the thousands of advertisements we read over the course of our careers from DuPont and others preaching to us about Firefighter cancer., and they they have our back. One "Google' of FF Cancer/DuPont/PPE' brings up thousands of hits:
http://protectiontechnologies.dupont.com/LP=3582

http://www.firedex.com/blog/2016/04/21/fire-dex-introduces-new-h41-interceptor-hood-dupont-nomex-nano-flex-technology-protect-firefighters-hazardous-particles/

https://www.firehero.org/

https://www.firehero.org/2017/10/26/dupont/

http://www.dupont.com/content/dam/dupont/microsites/dpt/Nomex-Knowledge-Center/PDFs/DPT17_23105_Firehouse%20Webinars_Understanding%20Smoke%20Exposure_Oct%205_LOW.pdf

https://ohsonline.com/articles/2018/01/24/iaff-firefighter-cancer-summit.aspx

http://innotexprotection.com/en/blog/dupont-everything-line-inside-counts/

http://www.wfrfire.com/clothing/BALACLAV/interceptor_brochure.pdf

http://www.firstrespondercenter.org/cancer/research/

http://www.firedex.com/solutions/carcinogens/

The list is endless, all the articles about 'washing your gear, washing your hood, washing your body, keeping gear on while overhauling, products of combustion, off-gassing, toxins, carcinogens,… all they while they were in litigation since 2000. And beginning in 2006 were put on notice by ECHA regarding PFOA in PPE. YET, NOT ONE WORD ABOUT PFOA AS A

CONCERN… EVEN WHEN EPA NAMED IT A CEC (contaminate of emerging concern) THEY REMAINED SILENT ABOUT PFOA AND PRECURSORS IN OUR PPE. The precursors will degrade/form PFOA. Some in as little as ONE YEAR.

They have the nerve to teach and preach to us about FF Cancer…. While remaining silent on their toxin in our gear. Knowing it is a reproductive cancer. A endocrine disruptor. Knowing it loves the organs and doesn't hide in adipose like other toxins do.

Yes, they got our back, they love us to death.

MANUFACTURERS IN OUR RESEARCH

Manufacturers are very involved in our turnout gear soils research… but, none were ever tested for PFAS's.. even while DuPont knew PFCs were used in our PPE. From 2013:

https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1007&context=mat_etds

topic and the concern for your firefighter, for that I am grateful. Thank you to Don Aldridge who has passionately has interest for the firefighter's well-being and encourages studies such as this one to be completed. I would like to thank Deborah Lander of DuPont Haskell, for your guidance, encouragement, hard work and attention to this study. Richard Young of DuPont, Daniel Silvestri of 911 Safety Equipment, Jim Baker of LION Total Care, Karen Lehtonen of LION Apparel, Joey Underwood of Safety Components, Brian Shiels of PBI Products, Diane Hess of PBI Products, and Kim Henry of PBI Products, thank you for devoting countless amounts of time, suggestions and interest to this study, without all of you this study would have not been possible. I wish to dedicate this paper to my parents, Hubert and Arbutas Huston for their support and encouragement throughout my academic career. Lastly, I would like to thank my family and friends for standing by my side and always offering words of encouragement.

And:
https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1004&context=mat_etds

Patricia Freeman of Globe Manufacturing, Richard Young of DuPont, Karen Lehtonen of Lion Apparel, Tricia Hock of Safety Equipment Institute, Deena Cotterill of Fire-Dex, and Stacy Trenkamp of ArcWear devoted countless amounts of time and thought to this study and I want to thank them for their suggestions, guidance and attention. Ken Hanzalik of 3M Occupational Health and Environmental Safety participated and assisted with testing for this study

Still, no one mentioned to test for PFAS……. There are many more studies just like this.. no PFAS studies on the PPE though.

3M

IN 1999, 3M KNEW THE ROUTES OF EXPOSURE FROM CHEMICALLY TREATED PRODUCTS FOR WATER REPELLENT WERE DERMAL AND INHALATION. 1999.....
https://www.fluoridealert.org/.../pfos.fr.final.docket.0008.p...

Please note what they considered 'High' exposure times:

3M : 1999 report Estimated Exposure Times:
Low= *l hr., 60 days
Med. I-4 hrs, 50-I 00 days
High= ~4 hrs., > 100 days
****

FROM 1999 3M REPORT....
page 197:
F. Coatings and Coating Additives
1. Business Definition
2. Products and Market

page 214:
F. Coatings and Coating Additives
Coatings-This segment includes formulators who utilize 3M fluorochemical polymer coatings as received or in combination with other materials to import soil or water repellency to a surface. Typical applications include application of such coating to household or commercial surfaces or electronical or electronic components.
Products
CA-5
CA-6

page 311 '
CA-5
Most Likely Route of Exposure
End Use Coating; DERMAL , INHALATION

and regarding AFFF:

3M Report 1999

PG 235

AFFF FIREFIGHTER EXPOSURE; DERMAL, INHALATION, INGESTION.

Please note, in 2006, the European Chemical Agency or ECHA, notified all manufacturers of textiles who used PFOA or precursors that they were restricting the use of these chemicals in their country and that began the process of 8 years of documents, reviews, public comments, and the ECHA's decision to limit PFOA to 2ppb in firefighter turnout gear. The manufacturers

wanted to 'derogate' firefighter PPE altogether. To shelve it. To omit FF PPE from the list of textiles to be covered. Knowing, that our firefighters heat up, sweat, and draw in toxins.

The PPE manufacturers are well aware of our cancer statistics. They fund a good portion of our firefighter cancer programs and research, as well as promote, educate and print literature on the hazards of toxins, cleaning our gear, cleaning our bodies, not putting gear in our trucks or bringing our gear into our homes.

Yet not one word of PFOA to America's bravest.

****

Along the same lines as the undisclosed PFOA in PPE during NFPA committee meetings, was the release of a document this past year that revealed the sentiment of a member of the NFPA #11 FOAM Committee. It first appeared the documents were from the NFPA committee itself, however, that was later shown to be incorrect, it was the committee members' personal notes. None the less, quite revealing what he knew.

http://www.theintell.com/news/20170609/dangers-of-firefighting-foam-discussed-in-2001-document-shows

Dangers of firefighting foam discussed in 2001, document shows

By Kyle Bagenstose

Posted Jun 9, 2017 at 12:01 AM

Updated Jun 9, 2017 at 5:00 AM

More than a decade before drinking water supplies in Bucks and Montgomery counties were found to be contaminated by firefighting foams used at three military bases, the foam makers and the military were privately discussing and debating the dangers the foams presented.

That's according to a series of documents reviewed by this news organization, including the authenticated March 2001 notes of a meeting of foam manufacturers.

Firefighting foams that broke down into unregulated, toxic chemicals PFOS and PFOA were sold to the military from 1970 to 2015 and used at hundreds of bases across the country -- including the local bases. In recent years, they have become a nationwide

focus for the Department of Defense, which is phasing out the foams and searching for contamination.

But alarm bells were already ringing at the 2001 meeting of the National Fire Protection Association's Technical Committee on Foam. The association is a trade group that creates national standards and codes for firefighting equipment and protection.

A document obtained by this news organization recounts the meeting in a minutes-like format. However, NFPA communications manager Susan McKelvey told this news organization in an email that the document is not an NFPA record and that the organization does not know who authored it. We are continuing to investigate the origin of the document, but we previously verified its accuracy through interviews with several attendees and corroboration with other meeting materials provided by the NFPA.

See documents here: https://www.documentcloud.org/documents/4178280-NFPA-Schedule.html

PFOS, PFOA 'threat'

According to the document, 28 people — including representatives from firefighting foam makers 3M, Ansul, Chemguard and National Foam — attended. The committee's then-chair, Chris Hanauska, led off the meeting, saying PFOS- and PFOA-based foams represented a "threat" that would "at the very least," lead to substantial changes in **the NFPA's foam standards. Hanauska was with** Baltimore fire protection engineering firm Hughes Associates (now Jensen Hughes).

"The statement appeared to put the attending foams manufacturers on the defensive throughout the remainder of the meeting," the document read, adding, the "Ansul people were quite glum throughout."

Hanauska also delivered a presentation titled, "The Problem with Foam." In it, he discussed growing concerns about the safety of foams containing PFOS and PFOA. The document says Hanauska noted PFOS was shown to have "PBT" traits: persistence in the environment, bioaccumulative in animals (meaning the chemicals accumulated in their bodies), and toxic.

"Exhibition of one of these traits is bad, two makes its use questionable, and when all three are present, it is a death warrant. PFOS has all three," read the document, summarizing Hanauska's presentation.

Dick Ottman, then 3M's foam marketing manager, discussed the company's May 2000 decision to discontinue producing PFOS and firefighting foams. The announcement sent a shock wave through the foam industry, as 3M was the military's primary foam supplier.

Ottman told the attendees, who included a representative of the U.S. Coast Guard and a Navy contractor, that 3M stopped making PFOS and firefighting foam because of its "proven persistence, pervasiveness, and toxicity," and that 3M "has no intention to ever get back into the foam business."

One 2001 meeting attendee, Dan Diehl, who was with the Alaska State Fire Marshal's Office, said of the foam companies: "They didn't want that information, I believe, to be public information," adding that the foam technical committee is "pretty much run by the manufacturers. So they want to control anything that comes out of those meetings."

This news organization sent questions to Ansul, Chemguard, and National Foam. An attorney representing National Foam declined comment due to ongoing litigation; Ansul and Chemguard didn't respond.

A 3M press release announcing the foam phaseout in 2000 quoted then-executive vice president Charles Reich as saying the "products are safe," and the phaseout was "based on our principles of responsible environmental management."

Military knowledge

After being provided a copy of the 2001 document, the office of U.S. Sen. Bob Casey, D-Scranton, wrote a letter to the Department of the Defense Tuesday requesting more information.

"My constituents deserve to know when the Department of Defense had information to suggest that the use of (firefighting foam) had adverse impacts on health and the environment," Casey wrote, asking for an answer to that question, a copy of the 2001 DOD letter to 3M that was read at the meeting, and any related materials.

Congressman Brian Fitzpatrick, R-8, of Middletown, wrote in an email that he found the issue "troubling" and he'd also be reaching out to the Department of Defense for more information.

"Getting to the bottom of who knew what, and when they knew it is crucial," Fitzpatrick wrote.

State Rep. Todd Stephens, R-151, of Horsham, called the 2001 document a "smoking gun."

"If the federal government knew the danger these chemicals posed to our residents as far back as 2001, those responsible for their continued use and those who withheld this information from our community must be held accountable," Stephens wrote in an email.

Mark Cuker, a Philadelphia environmental lawyer with Williams, Cuker, Berezofsky who's suing Ansul, Chemguard, National Foam, 3M, and the U.S. Navy over the local contamination, called the document "the most stunning, revealing document I have seen in over 40 years of practicing law. It is deeply disturbing that the companies involved so completely abdicated their responsibility to protect human health and the environment."

Makers dispute danger

According to the 2001 document, Ansul and Chemguard representatives said their companies' foams, which were created using a different process than 3M's and didn't contain PFOS, weren't known to be as toxic. At the heart of that part of the debate was whether the foams made by Ansul, Chemguard, and National Foam broke down into dangerous byproducts.

Eventually, scientists discovered the alternative foams could break down into PFOA, but that wasn't known for certain in 2001 — and researchers still aren't sure how much PFOA came from the foams.

"There were a lot of questions about how much and how quickly these chemicals form PFOA," said Chris Higgins, an associate professor with the Colorado School of Mines' Department of Civil and Environmental Engineering. "That was discussed in the scientific literature and to some extent is still being discussed."

The document also listed a Chemguard representative named Kirtland Clark as an attendee. Reached last week, Clark, who now owns a private consulting company in Texas, said he was a lead researcher of firefighting foam products with Chemguard until 2009, and before that, with chemical company Ciba-Geigy. He said he was responsible for several patented technologies.

He recalled the timing of 3M's decision to stop making foams as a "shock," but said he ultimately expected the company to do so because a long-term study on monkeys resulted in some animals dying after being chronically exposed to PFOS. "We knew (3M was) going to have to do something, but what we didn't know was that they were going to pull out as rapidly as they did," Clark said.

But, Clark said, he believes the Chemguard foams didn't pose as big of a risk as 3M's because they were made using a different process.

Clark echoed what Keith Olsen, an Ansul representative, said in 2001. According to the 2001 document, Olsen said the company's foam-ingredient suppliers, who weren't identified, advised Ansul the materials' toxicity was far less than the hazard posed by PFOS-based products like 3M's foams. Olsen argued that the foam committee "should wait until current research data is in hand before discussing it further."

Warning on all foams

But even in 2001, foam committee chairman Hanauska predicted the alternative foams would be a problem, forecasting in his presentation that research into the companies' foams would come back as "not generally favorable," and result in tight regulation. He stated it was "unlikely" the foams would come back as "clean."

It appeared the DOD shared Hanauska's view: The 2001 document said the department's letter to 3M described the alternative foams as "persistent" and "toxic" and noted the EPA was "taking actions to determine hazard level."

Hanauska's prediction that the foams of Ansul, Chemguard, and National Foam would pose an issue was eventually proven correct.

In 2002, the EPA prioritized its reviews of PFOA. In 2005, it issued a $16.5-million penalty against DuPont, a major PFOA manufacturer, for failing to submit internal PFOA toxicity studies that went back decades. The following year, the EPA announced a "voluntary" agreement was reached with eight major PFOA manufacturers, including DuPont, to phase out the chemicals' production in the United States by 2015.

Jennifer Field, a professor of environmental and molecular toxicology at Oregon State University, has been studying the chemicals for decades. She said her early research, around 2003, didn't suggest PFOA came from Ansul, Chemguard, and National Foam products. "We suspected that PFOS and PFOA only came from 3M (products)," Field said.

But followup research, including some by DuPont, showed the chemicals in alternative foams could break down into PFOA, Field said.

According to a 2014 newsletter from a foam industry group, the knowledge prompted a "response" among foam manufacturers to develop new chemistry to meet with the EPA's 2015 phaseout program for PFOA.

Speaking last week, 3M's Ottman said foam manufacturers hadn't really studied potential issues with their products before they were being used, adding he believes 3M was one of the first to do so before its 2000 phaseout announcement.

Not any of the major chemical companies had given much thought to what the ultimate consequences were of putting their product into the environment," Ottman said. "I think we caught the other (companies) off guard because they hadn't done, I don't think, much research into the pervasiveness of their products."

Slow, tricky transition

The phaseout, by 2015, of all firefighting foams that could breakdown to PFOS or PFOA presented a challenge to the companies because the foams were so effective in smothering fires.

"The foams save lives," said 3M's Ottman. "The downside is that (they were) pervasive (in the environment)."

But other foam formulations, believed to be less toxic, initially weren't as effective and risked failing the required test for military use, several interviewees said.

In 2015, records show the Navy removed old foam formulations from its qualified products list in favor of new ones. Advertising its updated foam product, Chemguard wrote that its new production process "produces no PFOS," and that its foam ingredients "do not break down to yield PFOA."

Field said it's "hard to tell" the accuracy of those claims because the new formulations haven't been studied independently.

"We don't have a trust, but verify program," she said.

Staff writer Jenny Wagner contributed to this story.

What did the military do as concerns over firefighting foam grew? A future story will explore this topic.

Kyle Bagenstose: 215-949-4211;
email: kbagenstose@calkins.com; Twitter: @KyleBagenstose

The release of the above mentioned article by Kyle Bagenstose prompted my email NFPA CEO Jim Pauley;

https://www.facebook.com/permalink.php?story_fbid=1867705870220154&id=1808869939437081

June 12, 2017

Dear Jim,

Recently I contacted you regarding the concern of PFOA in fire fighter turnout gear.
You were kind enough to put me in contact with Chris Dubay your VP/Chief Engineer.

This past Friday, the minutes of NFPA 11 from 2001 were released in a PA newspaper and many questions have risen.

This letter is both to ask for changes for labeling in our turnout gear, ask for NIOSH studies regarding PFOA in our firefighters and our stations, and to involve other parties who may not be aware of the knowledge that PFOA was used as a DWR on our gear. I am not affiliated with any group or organization. My husband was a 28 year member of Worcester Fire Department, MA. Retiring in 2015 after his cancer diagnosis and surgery.

We entrust our safety and health to the manufacturers that sit at the NFPA tables.

http://www.theintell.com/.../article_d4a5bbbc-4a25-11e7-ac80-...

However, when this type of alarming discussion is happening during a NFPA committee, formed for the very reason to protect our fire fighters, and then remains secret for 16 years, it erodes the hard work of all committee members and the NFPA itself. It adds to the suspicion of organizations, and manufacturers who many now regard as deceptive. I realize this was before your time, however, with a NFPA liaison present, how is it word never reached our FF's?

Jim, may we hear from you ,directly, to inform us what measures are in place to ensure, when word of any known toxin from a substance that our firefighters wear, or that is used in their duties, that word gets through to the front lines.

In 2001, with all these committee members sitting at a NFPA table, not one person thought it their moral or legal duty to tell FF Nation.

This is why I am calling on NFPA, in their framework, require each (M) Manufacturer committee member, who uses a known toxin, or a toxin is generated in the production of the product of gear or equipment used by firefighters, that it be mandatory the toxin be reported during the committee meeting and a chain be in place that it reach all FF's in this nation.

That if there is chemical registration in another country that classifies a substance as hazardous and it is used in our turnout gear, that NFPA be notified and that information be forwarded in the chain and posted on your NFPA website.

In addition, to restore faith, each (M) Manufacturer committee member should sign a oath of knowledge, that their company has or has not been made aware of a hazard or toxin and should there be a toxin/hazard, that the NFPA liaison report that directly to you during that committee revision meeting.

Also, in lieu of the recent disclosure from the manufacturers, information should also posted on your website by the trade name of the end product, such as 'Kombat, Advance, Brigade, etc., and the contents of the DWRs used on/in the material, so that each firefighter can check for themselves what
the toxins are in their gear, as well as and amounts used of toxin. This is no longer an option. We have been lied to by the manufacturers and now demand to know what was in our gear and the amounts of same.

I am no longer able to keep up with the many daily messages from the Facebook page I manage titled 'Your Turnout Gear and PFOA' from fire fighters asking if PFOA is in their gear or was in their gear from 5, 10 or even 20 years ago.

We can no longer accept the position that it is proprietary information from manufacturers. With 64 of 100 firefighters diagnosed with cancer, and the knowledge of these toxins are in our gear, we have the right to expect all material be labeled. Manufacturers lost the CBI privilege when they neglected to tell us about the PFCs yet continued to produce literature about fire fighters and cancer while never acknowledging past and present PFC use.

In the released minutes of the 2001 NFPA Foam meeting, multiple manufacturers sat together and not one party told the firefighters who use the end product. In the case of the PFOA on the

gear,
the chemical giants all knew in 2006 what was happening in Europe as they also served on the NFPA PPE
committees and did not say a word. Nor did they bother to submit the form "Statement of Problem and Substantiation for Public Input" that I saw referenced in Structural FF PPE ROP's.)

For example, the financial statement of DuPont in 2007 references the European Union
and new regulatory framework. This manufacturer should have told NFPA of the risks associated with
their treated textiles in 2006 when they were informed by ECHA European Chemicals Agency:

https://s2.q4cdn.com/.../files/doc_fina.../2007/DD_2007_10-K.pdf
Page 42, under Item 7. Part II :

In December 2006, the European Union adopted a new regulatory framework concerning the Registration, Evaluation and Authorization of Chemicals. This regulatory framework known as REACH entered into force on June 1, 2007. One of its main objectives is the protection of human health and the environment. REACH requires manufacturers and importers to gather information on the properties of their substances that meet certain volume or toxicological criteria and register the information in a central database to be maintained by a Chemical Agency in Finland. The Regulation also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified. Pre-registration will occur between June 1, 2008 and November 30, 2008; complete registrations containing extensive data on the characteristics of the chemical will be required in 2010 if production usage or tonnage exceeds 1,000 metric tons per year; 2013 if it is between 100 and 1,000 metric tons per year; and 2018 if it is 100 metric tons per year or less. By June 1, 2013, the Commission will review whether substances with endocrine disruptive properties should be authorized if safer alternatives exist. By June 1, 2019, the Commission will determine whether to extend the duty to warn from substances of very high concern to those that could be dangerous or unpleasant. Management does not expect that the costs to comply with REACH will be material to its operations and consolidated financial position.

>>

Jim, should they not report a known SVHC they use in the gear they distribute to our firefighters, they do not deserve to be on NFPA committees deciding safety measures for our firefighters.
Had the chemical giants told our firefighters of the issues they were facing in Europe back in 2006, we could have avoided much mis-information now. I receive messages daily from fire-fighters saying they were told the PFOA in the gear only happened in Europe. Or that they have been told there is nothing to worry about.

In this document, Dupont states the presence of PFOA:
http://www2.dupont.com/.../asse.../downloads/pfoa/WhatisPFOA.pdf
• PFOA may be found at very low trace levels in some fluorotelomers. Fluorotelomer derivatives are a family of compounds used as ingredients in making firefighting foams and coatings because of their unique properties. They are also intermediates, or building blocks, used to manufacture stain-, oil- and water-resistant additives for some textiles, paper, coatings and other surfaces.

Yet here, in DuPont's May 2017 statement on PFOA there is no mention of the unintended by products:
http://www.dupont.com/.../position-stateme.../articles/pfoa.html

>>>

Also confusing is the the conflicting information released over the last few years by the IAFF.
In 2011 the IAFF PFC Fact Sheet under Toxic Exposure (see attached), IAFF stated " It is possible fire fighters
are exposed to PFCs through fire fighting foam and to PFCs used to make fire fighting gear water and stain resistant."

As well as the 2015 IAFF Publication; Fire Fighters and the Evaluation of Cancer Causation, Pages 53 - 62: http://services.prod.iaff.org/ContentFile/Get/10183 (see attached)

Perfluorinated Alkyl Substances (PFAS) Stain-resistant coating on upholstery, carpets, performance clothing, non-stick coatings on cookware, food wrapping, surfactants in firefighting foams Endocrine disruptors, liver, heart disease, cancer (PFOA)

and:
Teflon Chemical Might Be Unsafe at Any Level New study shows EPA drinking water standards 100X too high (Grandjean and Clapp 2015) PFOA (C8) Levels in Fire Fighters vs General Population

These messages contrast the IAFFs 2017 PFOA and Turnout Gear Statement (attached) that summarizes, in my opinion, the word
of the manufacturers is sufficient, without the actual numbers and amounts of PFOA used in the chemical coatings:
https://docs.wixstatic.com/.../fbe7dd_cc4b2d5a744b4b1f8ca967a...

Conclusions

Exposure to PFOA is very common in US and Canadian populations due to its extensive past use in a wide range of products from carpets to stain and water resistant fabrics and upholstery to nonstick cookware. Importantly, PFOA use has been almost completely phased out in the US under the PFOA Stewardship Program and in Canada through recent regulation. Fire fighters may have additional PFOA exposure sources such as older Class B fire fighting foams. If PFOA is a combustion product of PFOA-containing consumer products made prior to phasing out use of this chemical, fire fighters will be exposed in fire suppression activities. However, the data are too limited at present to determine this. PFOA is unlikely to be a component in recently US manufactured turnout gear. However, if PFOA is a combustion product, it may be present as a contaminant on turnout gear. PFOA may also be present as a manufactured component of legacy turnout gear, or in turnout gear manufactured in other jurisdictions. The exposure contribution from any such PFOA content is likely to be minimal since volatilization from the manufactured product would be required.

Recommendations At this time, IAFF does not recommend that legacy turnout gear be replaced outside of its lifecycle. Fire fighters wishing to minimize PFOA exposure should continue to wear their PPE, including SCBA, and regularly decontaminate their turnout gear. IAFF will continue to monitor developments and update this fact sheet should new information become available.
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>>>>>>>>>>>

Jim, as you are well aware, past history in the fire service shows many organizations working together, to support safety measures when brought to the attention of chiefs, NIOSH, NFPA, IAFF, etc. As was the case with Diesel Exhaust:

Diesel exhaust exposure is addressed by the National Fire Protection Agency (NFPA) in its 1500 standard. The standard states, "The fire department shall prevent exposure to firefighters and contamination of living and sleeping areas to exhaust." Many different products are available to remove diesel exhaust and minimize exposure to firefighters, including in-station exhaust systems, ventilation systems and apparatus-mounted removal systems. The above information can be used to justify the cost of these systems to help decrease the risk of cancer and improve the overall health of firefighters. http://www.firehouse.com/.../cancer-and-the-fire-service

see also: https://firefightercancersupport.org/.../diesel_emissions_in-...

As well as the IAFFs strong movement on Flame Retardants: Resolution 34 by the IAFF (attached) http://iaffconvention2014.org/resolution-no-34/

84 RESOLVED, That the position of the IAFF will
85 continue to support affiliates at the local, state and
86 provincial level in any attempt to ban flame

87 retardants, industrial chemicals and other known
88 toxins through legislation, regulation or standard
89 changes; and be it further
90 RESOLVED, That the IAFF work to ensure that
91 the use of carcinogenic flame retardants and other
92 toxic chemicals are eliminated and safer alternatives
93 or methods are pursued, such as California's standard
94 TB-117-2013, including the development of non-
95 toxic standards through the National Fire Protection
96 Association, International Code Council,
97 Underwriters Laboratories and similar testing
98 Organizations; and be it further
100 RESOLVED, That the IAFF gather additional
101 scientific research and studies regarding fire fighter
102 exposure to carcinogens, toxic flame retardants and
103 other toxic chemicals, as well as continue to educate,
104 train and heighten the awareness of its members to
105 the dangers of these toxic chemicals and seek
106 preventative measures to lessen fire fighters risk of
107 developing cancer

Fire fighters need to see the same combined efforts again of these organizations working together to ensure that each fire fighter that dons the gear daily, is not wondering what they are wearing. They deserve nothing less.

In December of 2016, the International Agency for Research on Cancer, shows PFOA as a Group 2B toxin.
It is no longer good enough to let manufacturers dictate what they will and won't share about the garments they provide. Not in light of the released minutes.

IARC Volume 110 / Perfluorooctanoic Acid, classifies PFOA (see IARC PFOA attached):
6.3 Overall evaluation Perfluorooctanoic acid (PFOA) is possibly carcinogenic to humans (Group 2B).
>>
In the case of PFOA, we are not given the opportunity to see amounts as it is called 'proprietary information', as was noted in the notes and comments of the ECHA Annex XV Early Comments, where textile manufacturers stated their amouts were 'proprietary' over and over.
>>>
Our firefighters should have knowledge of what they are donning. They do not provide substance amounts, and leave it for firefighters to wonder if they will be the next to be diagnosed. In light of this weeks release of the NFPA 11 2001 minutes, the manufacturers have dug themselves quite a hole. I I question if a chemical giant would put their child in turnout gear for decades at a time knowing what the amounts of PFCs were used (past or present).
>>

While we are not discussing PFOA here in PPE in the US, there is plenty of discussion in Europe.
In February 2015, Delegates attending the highly successful PPE & Duty of Care Forum (see attached) held in Birmingham where manufacturers and health officials discussed PFOA and turnout gear.

Highlights:

https://www.firerescueforum.com/content

PPE & Duty of Care Forum 2016

Personal protective equipment (PPE) is the last line of defence for firefighters yet few Fire & Rescue Services fully understand how the latest generation of protective clothing works or how it should be managed effectively in the light of imminent EU-wide chemical restrictions. At this one-day conference, you can.

What will it cover?

* Disposal of firefighting clothing that contains restricted chemicals
* Maintenance of clothing containing restricted chemicals
* Legal and financial obligations regarding current contracts
* Legal and financial obligations of service contracts
* Managing a potential transition to non-PFOA PPE

* Dr Roger Klein of Cambridge (UK) and Christian Regenhard Center for Emergency Response Studies, John Jay College of Criminal Justice, CUNY, New York provided an insightful presentation on the history and latest developments regarding PPE and fluorochemicals in the fire service.

Around three quarters of all global fluorotelomer production is used for treating textiles and paper in order to give water and oil repellent coatings. However, concern over the potential environmental impact of fluorochemicals has grown since the announcement in May 2000 that 3M would be phasing out PFOS-based production involving Lightwater and ATC foams as well as Scotchgard protective coatings.

Modern emergency services' PPE makes extensive use of fluorotelomer-treated fabrics for protection against both polar, i.e., water and alcohols, and non-polar, i.e., hydrocarbons, oils and greases, contaminants. The commonly used fluorotelomer acrylate and methacrylate polymers have been characterised traditionally by predominantly C8, C10, and C12 chain lengths, in order to get the required performance and durability of finish

However, increasing concern by regulatory authorities over the environmental and human health impact of releasing PFOA – and longer chain perfluorocarboxylic acids (PFCAs) –to the environment based on unacceptable PBT (persistent, bio-accumulative, toxic) profiling has led first to the voluntary PFOA Stewardship Program 2010/2015 by the US Environment Protection Agency and, more recently, to the European Chemical Agency (ECHA) PFOA Restriction Proposal initiated by the German and Norwegian governments.
The ECHA PFOA Restriction Proposal sets out to limit free PFOA to 25 parts per billion and PFOA precursors to 1,000ppb (or 1ppm) in all manufactured articles. This is a modification to the original overly strict limit of 2ppb for both free PFOA and PFOA precursors which followed an industry-wide consultation.
In order to give industry time to develop alternative technologies, however, there are specific time-limited derogations for firefighting foam of 1ppm for both PFOA and PFOA precursors, and for protective clothing used by the emergency services, police and military.
The situation is particularly acute for all-weather clothing and hazardous materials PPE since these applications have relied on using fluorotelomer polymers especially rich in C8, C10 and C12 fluorotelomer chains. All C8 fluorotelomer derivatives are known to breakdown to PFOA in the environment. By analogy, C10 and C12 fluorotelomers will yield perfluoro-n-decanoic acid and perfluorododecanoic acid, both of which are more toxic and bioaccumulative than PFOA. All PFCAs are highly environmentally persistent.
Since the introduction of the PFOA Stewardship Program industry has switched to fluorotelomer derivatives using so-called pure C6 compounds. Unfortunately even the very best of these are still contaminated with significant levels of C8 derivatives (and possibly C10, C12…) in terms of

achieving the very low levels of PFOA precursors required by the ECHA Restriction Proposal, although free PFOA levels have been drastically reduced. Moreover, switching to pure C6 fluorotelomer derivatives has highlighted problems of achieving functional efficiency, especially in terms of the required levels of oil and water repellency, durability, and maintenance costs.
The PPE industry is thus left with the pressing problem of developing an alternative to fluorochemical treatment that retains functionality and durability.

* Product development engineer Pavla Krizman Lavric at Tencate Protective Fabrics concentrated on the importance of the outer shell as the first line of defence as well as the impact that the transition in chemistry from C8 chemicals to C6 chemicals will have on the protection level given by the gear when it comes to protection against splashes of oil, water and chemicals. These substances are found in AFFF surfactants in firefighting foams, wetting agents as well as textile finishes on the outer shell of firefighters' protective clothing.
This shell not only provides resistance to mechanical effects such as abrasion, rips, cuts and tears but also provides water, oil and chemical protection via a chemical film on the fibres' surface. This film prevents droplets from penetrating the fabric whilst allowing moisture vapour and air to transfer through.
Fluorocarbon finishes are currently used because the alternatives do not provide the water and oil repellence required by EN469, the European standard for firefighting protective clothing. These finishes are durable but do not last the lifetime of the garment. In fact, their performance reduces with every wash. The only way to reactivate their properties is to treat the garment with heat and eventually the finish needs to be reapplied.
Krizman outlined the complexity and the many challenges presented by current spray and liquid chemical resistance testing required to meet EN469. A whole load of factors influences the results, ranging from the pre-test wash treatment, the tightness of the weave of the fabric, the smoothness of the fabric and the type of fibres being tested.
Industry is currently working to meet these stringent tests using C6 chemicals rather than C8 chemicals, but research so far has shown that the only way of reaching similar levels of performance without C8 is to use more concentrated chemicals or in larger volumes, which in the future could create a new environmental issue. 'The performance goes down as the chain size of fluorocarbon goes down from C8 to C6.'
While the expectations are that these challenges will be met, many misconceptions remain. First is that the life of the fluorocarbon finish determines the life of PPE clothing. This is not the case. Proper care and maintenance and timely reapplication will result in optimal finish performance during the lifetime of a garment. The only way to ensure the performance of a garment is to have a good track-and-trace system in place, by working with laundries with the experience of treating these kinds of garments. 'Don't rely only on what you think you know, and be aware that fabric testing in a laboratory does not reflect real life,' concluded Krizman.

* Bernhard Kiehl of WL Gore drilled down on the role of durable water-repellent (DWR) finishes and their role in firefighting as well as the challenges being faced with the phasing out of C8 chemicals.

Kiehl demonstrated what happens when the DWR fails on the outer textile layer – it gets wet leading to thermal insulation loss and to discomfort for the wearer. If the garment is a pair of gloves, for example, hands get cold and lose tactility, making it difficult for the firefighter to perform simple tasks.
Commenting on the phasing out of PFOA, Kiehl highlighted that even though traces of PFOA had been found in apparel it had never been considered an immediate risk for end users: 'There are several agencies around the world looking into that and because the trace amount was so small and dermal intake isn't really a major route, studies have concluded that wearing the apparel or footwear is not a risk to the consumer.'
>>
>>>
Jim, the statement from Mr. Kiehl regarding the 'trace amounts' as no PPE has been tested for PFOA past or present is untrue. Past amounts of DWRs on turnout gear have not been shared with

anyone. For a statement like this to be made we should be able to see the documents that support the amounts being called minute. There are tests that have shown the amounts on raincoats etc. but to equate the heavy duty repellents used on turnout gear to these amounts is a dangerous deception in my opinion.

The 2017 FIERO Symposium did not mention PFOA. Another missed opportunity. The 2019 schedule is not yet available, Hopefully discussion of PFOA will be llisted
: http://fireppesymposium.com/schedule.php

We also have documents confirming that fire fighters have higher numbers of pfoa in their serum:(see attachment): Community Exposure to Perfluorooctanoate: Relationships Between Serum Concentrations and Exposure Sources

In the general US population, median serum PFOA values are around 4 to 5 ng/mL, occasional values are above 20 ng/mL (4,5,9) with no significant gender differences.

Among those with potential occupational exposure, the highest median values were observed for firefighters at 453 ng/mL

>>
We have spent years trusting the manufacturers, but the 2001 NFPA 11 minutes have changed that. With the knowledge of how the manufacturers operate in a professional setting such as NFPA, which is intended to keep the health and safety of FF nation as its priority, and the deception practiced by omission, why would any man or woman don turnout gear without the labels showing exactly what is in it?

In 1999, this 3M document shows Protective Clothing as a 'end use' under their Apparel and Leather Fluorochemical Use, Distribution, and Release Overview Major Markets and End Uses See attachment: 3M Fluorochemical Use and Distribution...

>>
In light of the dermal absorption routes, inhalation route, oral route, the fact that our fire fighters were never made aware of this toxin. Where it degraded in their stations where they work, eat, and sleep. Urgent attention should be given to this matter to test their fire-stations, and each fire fighter at the cost of the manufacturers. The same attention should be given to this matter as was done for Diesel Exhaust, including the NIOSH testing and the Flame Retardants.

>>
Also concerning is how much PFOA may be in the serum of fire fighters from years of exposure in their stations where they work, eat, and sleep from the PFOA that has degraded from the gear and is deposited in the dust and surfaces of the stations. Please see page 125 of the ECHA BACKGROUND DOUCMENT (attached) regarding BACK CALCULATING:
The back-calculated intakes from serum concentrations for occupationally exposed workers were in the range 0.8 to 13189 ng/kg bw/day with an overall mean intake of 298 ng/kg bw/day

>>
Jim, the suspicion now raised by the recent release of comments made by manufacturers will only be overcome with their full disclosure and knowledge.

Below is a excerpt from a shareholders manual regarding the 2005 discussion of PFOA:

E.I. du Pont de Nemours and the GrowingFinancial Challenges of PFOA

https://www.healthandenvironment.org/.../DuPont_Shareholders_...(attached)

2005 - The Shareholder's Right To Know More Potential Impact on Product Lines
In the event that PFOA is restricted through regulation, or in the event that markets migrate away from the use of products made with PFOA, or that break down into PFOA, the impact on DuPont could be substantial. Analysts at JP Morgan have estimated that DuPont's PFOA-related product lines, fluoropolymers and telomers products, contributed about $1.23 billion to 2003 sales and $100 million to profit. DuPont's earnings in 2003 were $973 million on revenue of $27 billion. (page 23)

This report highlights the billion dollar buisiness of protective gear each year in the US alone: https://www.bccresearch.com/…/advanced-protective-gear-armo…
The U.S. market for advanced protective gear and armor has reached $4.5 billion and $4.7 billion in 2013 and 2014, respectively. This market is expected to reach at compound annual growth rate (CAGR) of 4.4% to nearly $5.9 billion in 2019.

>>
From Chris Hanauska's statement during the NFPA 2001Foam Committee;
"Persistant, Bioaccumulative, Toxic. Exhibition of one of these traits is bad, two makes its use questionable, and when all three are present, it is a death warrant. PFOS has all three.

So does PFOA Since 2012. Yet still no formal word to US Firefighters.

https://enveurope.springeropen.com/…/10.1186/2190-4715-24-16

Conclusion
Due to its intrinsic properties, PFOA fulfills the REACH PBT-criteria. The next regulatory step will be the identification of PFOA and its ammonium salt (APFO) as SVHC according to REACH and the addition to the REACH Candidate List. As a second step, a restriction proposal will be prepared to include both substances and precursors into REACH Annex XVII.

Lastly Jim, the elephant in the room. While not an NFPA issue, textile manufacturers are purchasing advertising in our fire related publications, magazines, online sites, at trade shows, supporting cancer studies, fire fighter cancer organizations, making videos, etc. The list is endless. It is suspicious when these manufacturers lecture our firefighters about washing their gear and their bodies and not storing their gear in UV, when the reality now shows they have known about PFOA and PFOS for decades and kept that from these same front line fighters.

Jim, thank you for the time you have spent reading this letter today. I'm sure it wasn't easy to do at times, but please keep pushing forward in this matter as I'm certain you have every intention to. **I will be mailing a letter to each of the parties listed below to secure their awareness and posting same to the page I manage.**

Sincerely,
Diane Cotter

cc.

Congressman James McGovern (MA)
Congressman Brian Fitzpatrick (PA)
State Rep Todd Stephens (PA)
State Rep office of Ken Donnelly (MA)
State Rep Bob Casey (PA)
Russell Halliday, Legislative Assistant/McGovern
David Swanson, General Counsel/Ken Donnelly

Christopher Dubay, VP/Chief Engineer NFPA

John Howard, MD, Director NIOSH
Frank Hearl, PE, Chief of Staff NIOSH

Harold Allen Schaitberger, General President IAFF
Patrick Morrison, IAFF Assistant to the General President
Larry Petrick, IAFF Deputy Director Occupational Health and Safety

I posted the above letter, and the following update from the response I received via conference call from Chris Dubay Chief Engineer of NFPA shortly thereafter on my Facebook page I use to keep updates and provide information on this subject:

**** IMPORTANT UPDATE **** I SPOKE WITH CHRIS DUBAY TODAY,6/16/17. HE IS VP, CHIEF ENGINEER NFPA, THIS IS NOT A "NFPA MINUTES" AS REPORTED BY JOURNALIST, BUT AN ATTENDEES PERSONAL NOTES ****** IT DOES NOT CHANGE THE KNOWLEDGE OF THE SENTIMENT IN THE ROOM, HOWEVER, CHRIS SENT THE ACTUAL NFPA MINUTES WHICH I WILL SHARE ALONG WITH MUCH INFORMATION **** WILL BE WORKING ON THAT THIS WEEKEND ******

Also, on June 16th 2017, when Chris Dubay and I spoke, he provided much insight as to the parameters of the NFPA, the process by which committee members are selected, who may serve on NFPA, the process for drafts, public comments, and final report. Chis also provided insight as to the structure of the NFPA being a neutral organization.

Important note. Of the parties that received this letter, Chris Dubay on behalf of NFPA and Jim Pauley, Congressman McGovern, and Senator Donnelly's office were the only parties to respond.

****

NFPA part 1

On December 12th 2017, I submitted the following comment TO INITIATE DISCUSSION OF THE CHEMICAL ADDITIVES IN OUR GEAR AND DEMAND LABELS BE ADDED SHOWING CHEMICAL CONTENT in response to a request on NFPA's website requesting comments for the possible change to their Standards for Contamination Control of PPE, Accessories, and Equipment. My comment in its exact form is as follows:

Greetings,

I am the wife of 27 year professional firefighter diagnosed with cancer in November 2014. He is currently cancer free.

I wish to respond to this portion of the NFPA Standards Council New Project Request for Contamination Control of PPE, Accessories, and Equipment:

"to establish the minimum requirements for the effective contamination control of fire department personal, their personal protective equipment (PPE), accessories, and equipment"

It is imperative we establish a baseline for each set of PPE purchased. From the shelf, or the manufacturer. Prior to the first incident.

The garments are made with chemical additives that until recently have gone largely unnoticed. The outer shell, will receive a DWR (durable water repellent) treatment that uses surfactants to protect against water, stain, oil and largely to meet your water resistant standard. The unknown contents of this additive is considered proprietary information and are not disclosed to the end user. The moisture barrier / thermal liner may also be treated with a ePTFE backing that adds additional chemical additives. Again, proprietary information.

However, what is known, is in order to meet the water resistance standard, the chemistry requires use of C6 and its' precursors. These are members of the PFAS family (polyfluoralkyl substances) for which we have no regulations currently here in the USA. The Stewardship Program in place did not mandate any removal of stock or prohibit back-stock of fabric using C8 chemistry.

The European Union has ruled that by 2020 all PPE must have no more than 25 ppb of PFOA and no more than 1ppm of precursors. There was extensive research done on this topic by the Committee for Risk Assesment as you may read here in the European Chemicals Agency Background Document:
https://echa.europa.eu/…/61e81035-e0c5-44f5-94c5-2f53554255…
See also the Opinion of the Committee for Risk Assesment:
https://echa.europa.eu/…/3d13dc3a-de0d-49ae-bfbd-749aea8849…

****
Please review this very detailed presentation from Dr Roger Klein on the subject of PPE and C6 that was delivered to attendants at the UK's PPE & Duty of Care Forum in February of 2016: http://hemmingfire.com/…/PPE___Duty_of_Care_Forum_-_condens…

Dr Roger Klein of Cambridge (UK) and Christian Regenhard Center for Emergency Response Studies, John Jay College of Criminal Justice, CUNY, New York provided an insightful presentation on the history and latest developments regarding PPE and fluorochemicals in the fire service.
Around three quarters of all global fluorotelomer production is used for treating textiles and paper in order to give water and oil repellent coatings. However, concern over the potential environmental impact of fluorochemicals has grown since the announcement in May 2000 that 3M would be phasing out PFOS-based production involving Lightwater and ATC foams as well as Scotchgard protective coatings.

Modern emergency services' PPE makes extensive use of fluorotelomer-treated fabrics for protection against both polar, i.e., water and alcohols, and non-polar, i.e., hydrocarbons, oils and greases, contaminants. The commonly used fluorotelomer acrylate and methacrylate polymers have been characterised traditionally by predominantly C8, C10, and C12 chain lengths, in order to get the required performance and durability of finish.

However, increasing concern by regulatory authorities over the environmental and human health impact of releasing PFOA – and longer chain perfluorocarboxylic acids (PFCAs) –to the environment based on unacceptable PBT (persistent, bio-accumulative, toxic) profiling has led first to the voluntary PFOA Stewardship Program 2010/2015 by the US Environment Protection Agency and, more recently, to the European Chemical Agency (ECHA) PFOA Restriction Proposal initiated by the German and Norwegian governments.

The ECHA PFOA Restriction Proposal sets out to limit free PFOA to 25 parts per billion and PFOA precursors to 1,000ppb (or 1ppm) in all manufactured articles. This is a modification to the original overly strict limit of 2ppb for both free PFOA and PFOA precursors which followed an industry-wide consultation.

In order to give industry time to develop alternative technologies, however, there are specific time-limited derogations for firefighting foam of 1ppm for both PFOA and PFOA precursors, and for protective clothing used by the emergency services, police and military.

The situation is particularly acute for all-weather clothing and hazardous materials PPE since these applications have relied on using fluorotelomer polymers especially rich in C8, C10 and C12 fluorotelomer chains. All C8 fluorotelomer derivatives are known to breakdown to PFOA in the environment. By analogy, C10 and C12 fluorotelomers will yield perfluoro-n-decanoic acid and perfluorododecanoic acid, both of which are more toxic and bioaccumulative than PFOA. All PFCAs are highly environmentally persistent.

Since the introduction of the PFOA Stewardship Program industry has switched to fluorotelomer derivatives using so-called pure C6 compounds. Unfortunately even the very best of these are still contaminated with significant levels of C8 derivatives (and possibly C10, C12…) in terms of achieving the very low levels of PFOA precursors required by the ECHA Restriction Proposal, although free PFOA levels have been drastically reduced. Moreover, switching to pure C6 fluorotelomer derivatives has highlighted problems of achieving functional efficiency, especially in terms of the required levels of oil and water repellency, durability, and maintenance costs.

The PPE industry is thus left with the pressing problem of developing an alternative to fluorochemical treatment that retains functionality and durability.
****

You may also read his power point demonstration, pages 43-
92:http://m.hemmingfire.com/…/burlington+presentations+for+web…

****

Complicating the issue is the subjective language being used by the manufacturers of PPE. The current conditions have brought forth statements from some manufacturers stating 'trace amounts' are used, or ' no PFOA is used in the manufacturing process' this is partially true, but the manufacturing process produces PFOA as an 'unintended byproduct of production', and uses precursors that will eventually form PFOA.

The routes of exposure for the toxin PFOA are; dermal, oral, inhalation.

****

This recent letter to the EPA, CDC, ATSDR and US Attorney General addresses this exact issue for firefighters regarding their PPE and FOAM, giving 190 pages worth of findings by Environmental Attorney Robert Bilott and C8 Science Panel member Dr Paul Brooks, is worthy of your time to understand the long term health effects of PFOA.

Firefighter Letter - Environmental Attorney Robert Bilott
https://www.documentcloud.org/…/3988104-Firefighter-Letter.…

****
Additionally, weathering of your gear in UV lights (your stations/bays) is also a factor and may contribute to PFC dust in your stations. Because there have been no PFC dust studies of your stations, this is more 'unknown' area.

https://www.nvfc.org/…/NIST-Report-on-Accelerated-Weatherin…
PAGE 29: 4. Summary and Conclusions: However, exposure of
NKB and KPB fabrics to simulated UV light caused rapid and extremely large loss in tear

and tensile strength. The aging performance profiles (APP) of both the fabrics were
similar in that significant deterioration occurred due to 13 d exposure to UV irradiation. (note: 13d exposure to UV irradiation in this study = 6.6 years of normal use, so don't think the deterioration occurs in 13 days please.)
This study indicates that the deterioration in the
physical properties of polyaramids and polybenzimidazole are mainly due to photooxidative
reactions, which change the chemical composition of the polymeric system
The photochemical reactions are associated with build-up of oxidation reaction products and new polymer end groups. These changes are known to be responsible for the loss in tensile strength as well as the color change.

****

Until the chemistry changes, and technology no longer requires PFASs and known toxins are not part of the chemical additives, no matter how small the amount, and because of the nature of your profession; bodies heating up, sweating in suits, permeation of toxins, the end user must know what he/she is donning. The end user must have the final say in the 'chemical additives' placed on their bodies.

We owe it to our front line to label our gear with the actual chemical additives and their amounts in ppm or ppb or volume. Same as you would expect when you purchase your food. You deserve nothing less. To not have this labeling and disclosure by the manufacturers is disingenuous to the end user. We know PFC's are used in our gear. To take manufacturers at their word of 'trace amounts' is unacceptable. Period.

We now need to know which ones, and how much is in our gear from the moment we put it on brand new.

I suggest a first responder database to maintain their PPE purchase information. Brand, manufacturer, year purchased,
and chemical additive contents.

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I wish to take this opportunity to add that in August of 2017, my husband and I sent samples of 2004 PPE that was never worn or used.

The testing was provided by Professor of Physics, Graham Peaslee, of Notre Dame.

After 13 years we expected there to be no fluorine content left. I will close with the results as provided by Professor Peaslee.

Dear Diane,
Sorry for the slow response, but we ran your samples earlier this week (on Tuesday), and I have just looked through the results for four samples:
Left Under Arm firefighting suit FF-LUA
Moisture Barrier firefighting suit FF-MBTL
Right Sleeve by Cuff firefighting suit FF-RSC
Tail firefighting suit FF-T
The Moisture Barrier sample actually had two parts to it, a thin underlining fabric and the thicker outer layer. We labeled the thin fabric as MBTL2.
The results are pretty unambiguous...Everything except that thin underlining fabric was heavily fluorinated:
Sample counts/uC error ppm F Percent F
FF-LUA 24682 2472 10555 1.62
FF-MBTL 57530 5756 24603 3.77

FF-MTBL2 485 98 207 0.06
FF-RSC 20691 2073 8849 1.36
FF-T 18212 1826 7789 1.19
840 ppm F std 1964 128
We typically measure in parts-per-million, but these fabrics are so heavily fluorinated, they are better measured in percent fluorine content...each of the pieces contained between ~1 and ~4% fluorine (last column on right). This would typically indicate a very heavy treatment in PFAS chemicals to impart water and flame resistance to the fabric. We have seen values like this before, but typically only on fire-resistant fabrics.
We also looked at these fabrics yesterday with an X-ray Fluorescence unit, just to test for the presence of other flame retardants in the material, and we did not see any chlorinated nor brominated compounds nor heavy metals, so it looks like the flame-resistant properties of these materials are being given by fluorinated compounds alone...
I hope this information is useful to you. If you want to know which specific PFAS compounds are present in the fabrics (it can often be a mixture), then you would have to perform a chemical measurement using an instrument called Liquid-Chromotrography - Tandem Mass Spectrometry (LC-MS/MS). There are commercial companies that make these measurements (TestAmerica, for example), but they are complicated measurements and they typically charge several hundred dollars for a single analysis.
Please let me know if there is any other information I can provide for you....
GRAHAM

Respectfully,
Diane Cotter
Paxton MA

IARC Monograph: PFOA "Possibly Carcinogenic to Humans"
Published July 27, 2016
A monograph recently published online by the International Agency for Research on Cancer (IARC) classifies perfluorooctanoic acid, or PFOA, as possibly carcinogenic to humans. The monograph discusses "limited evidence" in humans for the carcinogenicity of PFOA, and identifies a positive association between exposure to PFOA and cancers of the testis and kidney. According to the monograph, PFOA has been used in non-stick coatings on cookware; membranes for waterproof, breathable clothing; electrical-wire casing; and fire- and chemical-resistant tubing. It's also been used in cosmetics, greases and lubricants, paints, polishes, and adhesives.

The newly published monograph is available on IARC's website (PDF).

echa.europa.eu
ECHA.EUROPA.EU

NEWER C6 CHEMISTRY

The newer C6 chemistry is not without controversy as well. This is why, it is so important we know what we are putting in the gear of our first responders who will then wear this gear while they sweat, and while their skin is absorbing at a higher rate.

Please see Dr Philippe Grandjean's discussion on this topic:

http://www.nikwax.com/en-us/aboutus/persistentflurocarbondanger.php

Fluorocarbons (PFCs)

Dr. Philippe Grandjean of the Harvard School of Public Health discusses the issues raised by his recent research into the effects of PFCs on children

PFOA and PFOS have been shown to be extremely persistent chemicals, both in the environment and in human tissue. A recent study has linked these chemicals to serious damage to the immune system in children (Grandjean et al, 2012). But PFOA and PFOS are just two of a family of fluorochemicals called PFCs, which in turn are part of the fluorocarbon family. Some manufacturers of domestically applied water-repellents claim that because their fluorocarbon products are PFOA or PFOS free, that they are risk free. Is that true? The following questions and answers should help you to make up your mind.

Human Studies

- Damage to immune system in children leading to an inability to respond to inoculations for tetanus and diphtheria (Grandjean et al, 2012).
- Increased incidence of cancer associated with PFC pollution (Bonefeld-Jorgensen et al, 2011)
- Compromised female fertility associated with PFC blood levels in women – delayed time to conception (Fei et al, 2009)

Rat Studies

- Enlarged livers associated with PFC
- Low birth weight associated with PFC
- Reduced fertility associated with PFC

(USEPA, 2009)

Does the claim "PFOA and PFOS free" demonstrate that a waterproofing product is not a fluorocarbon?
No.
PFOS and PFOA are just two of the family of chemicals called perfluorinated compounds (PFCs). All fluorocarbon water-repellents are made with PFCs or products that can biodegrade to PFCs.

What is the difference between a PFC and PFOS or PFOA?
PFC is the name given to the broad family of products called perfluorinated compounds. PFOS and PFOA belong to that family. PFOS and PFOA are therefore both PFCs. The difference between family members is primarily determined by how many carbon atoms are in the perfluorinated chain. PFOS and PFOA are both Octyl, that is, they both have 8 carbons.

What is the difference between a C6 and a C8 PFC?
PFOA and PFOS are both C8 PFCs. That means that they have 8 carbons in their chemical backbone. C6 PFCs are exactly the same, except that they have 6 carbons in their chemical backbone. PFHxA, the C6 equivalent to PFOA, is a persistent material but may not bio-accumulate in humans as much as PFOA. On the

other hand PFHxS, the C6 equivalent to PFOS, is also persistent and bio-accumulates just as much, and possibly more than PFOA or PFOS (US Environmental Protection Agency, 2009; Lasier et al, 2011).

Are PFOS and PFOA the only members of the PFC family shown to be potentially carcinogenic
Many members of the family, including some with fewer than 8 carbons have been shown to cause changes in cells that may lead to the development of tumors (Trosko and Ruch, 1998; Upham et al, 1998).

Are PFOS and PFOA the only members of the PFC family shown to be persistent in the environment, and to bio-accumulate in humans, or in other animals?
Not at all.
Most PFCs are potentially persistent in the environment and many bio-accumulate, including some which have carbon chains which are shorter than 8 (Dimitrov et al, 2004; Lasier et al, 2011; USEPA,2009).

How could a so-called PFOA-free fluorocarbon, which has been tested and found to be safe for pond life, degrade into dangerous PFOA?
PFCs are the chemical building blocks from which fluorocarbon water-repellents are made. When the PFC is chemically bonded into the fluorocarbon water-repellent, it is held safely in a large molecule that is non toxic. These large fluorocarbon water-repellent molecules contain fluorotelomers. As the fluorotelomer ages, it is biodegraded in the environment, or oxidizes, splits up, and releases smaller toxic PFC acids. If the fluorotelomer is based on a C8 PFC, then the end product of the biodegradation will be PFOA. So a so-called PFOA-free product can, over time, release PFOA into the environment (Dimitrov et al, 2004; Dinglasan et all, 2004; Ellis et al, 2004).

How long will it take for fluorocarbon water-repellents, or fluorotelomers, to degrade to dangerous PFC acids (of which PFOA is an example)?
There has been disagreement on how long the process will take. There is now general agreement that it does take place in a sufficiently short time to contribute to PFC pollution.

One study shows that trout which have been fed fluorotelomer subsequently convert the material to PFC acids in their livers (Butt et al, 2010). Therefore, in theory, the degradation can happen via digestion. This is a particularly important point to be taken into consideration when assessing whether fluorocarbon water-repellents should be used in the home. Food contamination could lead to the absorption of PFC acids direct into the body as a result of digestion.

The fluorocarbon industry produced research that indicated that biodegration in soil was an extremely slow process, taking thousands of years. However, when the US EPA repeated the research, they calculated a much faster rate of biodegradation and concluded that, "fluorotelomer-polymer degradation is a significant source of PFOA and other fluorinated compounds to the environment". Soil degradation is only one way in which the fluorocarbon water-repellents convert into more toxic PFC materials. (Washington et al, 2009)

Are C6 PFC based fluorocarbon water-repellents proven to be entirely safe?
No.
C6 based fluorotelomers will degrade and biodegrade to PFC acids in the same way as C8 fluorotelomers. Although the ultimate biodegradation product, PFHxA, may be less dangerous to humans and the environment than PFOA, it is still potentially dangerous. Furthermore, PFHxA is only one of a group of chemicals which will result from the biodegradation of C6 fluorotelomers. As well as PFHxA, fluorotelomer acids – bigger chunks of broken up fluoropolymers – will be produced in the biodegradation process. Fluorotelomer acids have been shown to be at least as toxic to aquatic life as smaller PFC acids (Michelle. M. Phillips, 2007).

Are PFCs the only members of the fluorocarbon family to bio-accumulate in humans, or in other animals
In a study of beached dolphins and porpoises in Chinese waters, a range of PFC compounds and other fluorocarbon chemicals, including PFOA and PFOS were found at high levels. But up to 70 per cent of the fluorocarbon material found in the dolphins was found to be unknown fluorocarbon chemicals (Yeung et al, 2009). This implies that not just the main PFOS and PFOA acids are bio-accumulative, but also a range of fluorocarbon materials that may come from varied sources, including the biodegradation products of fluoropolymers or pesticides.

Are fluorocarbon water-repellent liquid products for use in the home marked " PFOA or PFOS free" completely safe for the user?
No.
For all of the reasons mentioned above, all fluorocarbon water-repellents should be considered potentially hazardous for domestic use. To conclude, the factors below contribute to the conclusion that fluorocarbon water-repellent liquids are not ideal for use in the home:

- Liquids introduced into kitchens for use in washing machines can potentially cross-contaminate food.
- Fluorocarbon water-repellents biodegrade to a range of PFC acids including fluorotelomer acids
- Fluorotelomers, used in Fluorocarbon water-repellents, have been shown to biodegrade in rats and trout to PFC acids, and therefore may biodegrade via human digestion.
- PFOA and PFOS are just two examples of a family of toxic PFC acids
- PFC acids have been shown to be persistent in human tissue
- PFC acids have been linked to damage to the immune systems of children.
- The level of PFC acid required to potentially damage the human organism is extremely low: 10's of parts per billion. This would be the equivalent of less than a hundredth of a headache tablet, by weight, distributed in the whole body (Grandjean et al,2012).
- Humans cannot effectively excrete PFC acids (although some may be more easily excreted than others). Therefore PFC acids build up progressively in the human bloodstream over time even if there is a very small source of them.

AND:

https://www.rt.com/usa/334851-dupont-teflon-genx-cancer/#.WTfWT_Qv4Sk.facebook

Replacement chemical in Teflon causing cancer in lab rats - report

Yet, according to a new report by The Intercept, Dupont has filed 16 reports of *"substantial risk of injury to health or the environment"* over GenX.
Reports accessed by The Intercept were filed with the EPA between 2006 and 2013 under Section 8 (e) of the Toxic Substances Control Act. That section of the 1976 law requires an entity involved in the manufacture or dissemination of a chemical substance or mixture that has information that *"reasonably supports the conclusion"* that the substance *"presents a substantial risk of injury to health or the environment"* must inform the EPA.

EUROPE

WHEN ARE PFOS AND PFOA SAFE?

http://www.hemmingfire.com/news/fullstory.php/aid/2806/When_are_PFOS_and_PFOA_safe_.html

When are PFOS and PFOA safe?

Published: 25 October, 2016

German Federal Environment Agency (UBA) publishes official safe levels of PFOA and PFOS in human blood.

The safety thresholds have been set at 2 nanograms of PFOA/ml and 5 nanograms of PFOS/ml in blood plasma.

These levels, so-called HBM I values, represent the concentration of a substance below which, according to the German Human Biomonitoring (HBM) Commission's latest assessment, adverse health effects are not expected and no exposure reduction measures are necessary. The values have been published in Germany's Federal Health Gazette, Bundesgesundheitsblatt, which is the equivalent of the US Federal Register.

Evaluation of human epidemiological studies led the HBM Commission to conclude in July this year that exposure to PFOA and PFOS was adversely associated with fertility and pregnancy; weight of newborns at birth; lipid metabolism; immunity after vaccination; hormonal development; thyroid metabolism; and onset of menopause. In addition, it described these associated effects as 'well proven' and 'relevant'.

The UBA recently demonstrated that it was prepared to argue the validity of these conclusions even if it meant contradicting its own Government. In September it publicly corrected the Minister of Agriculture and Consumer Protection Peter Hauk after he had said in a television interview that no scientific studies were yet available that proved perfluorinated compounds (PFCs) were harmful.

According to Martin Ittershagen, head of public relations for the Federal Environment Agency: "The comments made in the interview with regards to the health effects of PCFs are wrong. There are numerous scientific findings from epidemiological studies through to experiments on animals," he later added: "When exceeding the HBM-I value, health effects cannot be excluded with sufficient certainty based on the current knowledge we have."

PFOA and PFOS are fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances. PFOA and PFOS, the most extensively produced and studied of these chemicals, have been used to make carpets, weatherproof clothing, fabrics for furniture, paper packaging and cookware. They have also been used for making AFFF fire fighting foam.

All human populations around the world carry varying levels of PFOA and PFOS in their blood. In a scientific study of blood serum concentrations of perfluorinated compounds in men from Greenlandic Inuit and European populations, published in 2012, it was found that in Greenland the average level of PFOS in blood was 52 nanograms per millilitre, an astonishing 10 times higher than the safe level published in Germany. In Poland, it was four times the limit and in Ukraine nearly twice the limit.

Nevertheless these levels have been in decline since 3M began to phase out PFOS production in 2000 and since the US Environmental Protection Agency introduced the PFOA Stewardship Program to eliminate PFOA production by 2015.

Given that PFOA and PFOS have been key ingredients in fire fighting foam for many years, the latest findings from the HBM Commission could raise concerns from members of the fire fighting community that have used AFFF containing PFOS or PFOA before their replacement with short-chain (C6) fluorotelomer surfactants.

DuPont Workers serum : 32 ng/mL

Firefighters 423 ng/mL

THE SCIENCE COMMUNITY

The science community has been remarkable in their outreach to each other, and to myself who is a reluctant advocate on this matter.

After a series of emails to the science community, we secured testing with Professor Graham Peaslee, of Notre Dame. Please see actual letter and results below: While we reached out to multiple fire service organizations, we came to learn we would receive no assistance in research or requests for research. We then began a grass roots effort via our Facebook page to solicit older, but new and never worn turnout gear. Somehow we were going to have it

tested. We received a reply from Jeremy Henthorn of North Carolina that a set had been secured for us and we purchased it. The set was used in a display room. Never worn. From 2004:

On August 11, 2017 the email from Professor Peaslee was posted on our Facebook page, Your Turnout Gear and PFOA:

On July 10th, Doctor Graham Peaslee, Professor of Physics at Notre Dame received the samples we sent him. The samples came from a 'new, never worn' set of 2004 gear I purchased that was used as a 'model' for a display.

PLEASE UNDERSTAND, THESE NUMBERS ARE FOR A "total fluorine" measurement meaning, the next step is to test for PFOA specifically, by it self which Dr Peaslee describes that next process. What is now known, is that if after 14 years, if there were no fluorines present, there would be no PFOA as well, because there are fluorines, we now must test to see the PFOA amounts by itself. There are various types of fluorines, but, in my opinion, because we know that PFOA was used as per the statements of the manufacturers themselves we will find PFOA. How much? The next test will tell us.

Dear Diane,

Sorry for the slow response, but we ran your samples earlier this week (on Tuesday), and I have just looked through the results for four samples:

Left Under Arm firefighting suit FF-LUA
Moisture Barrier firefighting suit FF-MBTL
Right Sleeve by Cuff firefighting suit FF-RSC
Tail firefighting suit FF-T

The Moisture Barrier sample actually had two parts to it, a thin underlining fabric and the thicker outer layer. We labeled the thin fabric as MBTL2.

The results are pretty unambiguous...Everything except that thin underlining fabric was heavily fluorinated:

Sample counts/uC error ppm F Percent F
FF-LUA 24682 2472 10555 1.62
FF-MBTL 57530 5756 24603 3.77
FF-MTBL2 485 98 207 0.06
FF-RSC 20691 2073 8849 1.36
FF-T 18212 1826 7789 1.19
840 ppm F std 1964 128

We typically measure in parts-per-million, but these fabrics are so heavily fluorinated, they are better measured in percent fluorine content...each of the pieces contained between ~1 and ~4% fluorine (last column on right). This would typically indicate a very heavy treatment in PFAS chemicals to impart water and flame resistance to the fabric. We have seen values like this before, but typically only on fire-resistant fabrics.

We also looked at these fabrics yesterday with an X-ray Fluorescence unit, just to test for the presence of other flame retardants in the material, and we did not see any chlorinated nor

brominated compounds nor are heavy metals, so it looks like the flame-resistant properties of these materials being given by fluorinated compounds alone...

I hope this information is useful to you. If you want to know which specific PFAS compounds are present in the fabrics (it can often be a mixture), then you would have to perform a chemical measurement using an instrument called Liquid-Chromotrography - Tandem Mass Spectrometry (LC-MS/MS). There are commercial companies that make these measurements (TestAmerica, for example), but they are complicated measurements and they typically charge several hundred dollars for a single analysis.

Please let me know if there is any other information I can provide for you....

GRAHAM

These results are very concerning.

If we have multiple sets of gear (sometimes 30 or more) degrading daily, weekly, in a station, over a period of years, in particular older stations where the PFOA was impregnated using the ECL method, what might the potential risk of surface contamination be from the gear? We know the PPE degrades in UV light, and our gear is stored in the station bays near the trucks.

Please see the following DUST STUDY pertaining to PFC's in households:

Perfluorinated Compounds in House Dust from Ohio and North Carolina, USA

http://pubs.acs.org/doi/abs/10.1021/es7032058?journalCode=esthag&

Elevated levels of perfluoroalkyl acids in family members of occupationally exposed workers: the importance of dust transfer

https://media.nature.com/full/nature-assets/srep/2015/150320/srep09313/extref/srep09313-s1.pdf

FIREFIGHTER PFC STUDIES:

https://www.ems1.com/ems-products/vehicle-equipment/exhaust-removal-systems/press-releases/324840049-NIOSH-update-on-U-S-firefighter-cancer-study/

NIOSH update on U.S. firefighter cancer study

Sep 22, 2017

In 2010, NIOSH researchers, with funding assistance from the U.S. Fire Administration launched

a multi-year study to examine whether fire fighters have a higher risk of cancer and other causes of death due to job exposures. Conducted from 2010 to 2013, study findings were released in 2016 and addressed limitations of previous fire fighter cancer research. The study included 30,000 firefighters from three fire departments: Chicago, Philadelphia and San Francisco. All of the data for the study came from existing records including detailed work histories of the position(s) each fire fighter held and the length of time he/she spent in that position.

A summary of the findings from the NIOSH website with links to more detailed information follows.

Q: What did NIOSH find?
A: Among notable study findings:
• Fire fighters had more cancer deaths and cancer cases than expected.
• This increase in cancer was primarily due to digestive, oral, respiratory, and urinary cancers.
• There were about twice as many malignant mesothelioma cases than expected. Asbestos exposure is likely in fire fighting and is the primary cause of this disease.
• Some cancers occurred at a higher-than-expected rate among younger fighters. For example, fire fighters who were less than 65 years of age had more bladder and prostate cancers than expected.
• Increased bladder cancer mortality and incidence was observed among women fire fighters, although there were few bladder cancers observed.
• The number of deaths from all causes combined (i.e., not just cancer) among fire fighters did not differ from the expected number based on death rates in the general population.

Q: What should we conclude from the results?
A: The findings suggest fire fighters are at higher risk of cancers of the digestive, oral, respiratory, and urinary systems when compared to the general population.
Additional information can be found from these studies by typing the url into your browser.
Findings from a Study of Cancer among U.S. Fire Fighters, July 2016 Fact Sheet
https://www.cdc.gov/niosh/pgms/worknotify/pdfs/ff-cancer-factsheet-final.pdf
Frequently Asked Questions, NIOSH Firefighter Cancer Study, November 2013
https://www.cdc.gov/niosh/firefighters/pdfs/FAQ-NIOSHFFCancerStudy.pdf
The National Institute for Occupational Safety and Health (NIOSH) Study of Cancer Among U.S. Firefighters Project Background and Goals
https://www.cdc.gov/niosh/firefighters/ffcancerstudy.html

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3855507/

PFOA and Cancer in a Highly Exposed Community: New Findings from the C8 Science Panel

Biomonitoring in California Firefighters Metals and Perfluorinated Chemicals :

Perfluorinated chemicals (PFCs) are widely used in homes and offices as stain repellent fabric and carpet coatings.13 Firefighters may also be exposed to PFCs through the use of some firefighting foams.14,15 Although foams designed to suppress Class A fires (eg, involving burning buildings or vegetation) are not reported to contain PFCs,16,17 those designed to suppress Class B fires (eg, involving flammable liquids) routinely contain fluorinated surfactants.18 Animal toxicology and epidemiologic studies on some PFCs indicate that this class of chemicals can affect the human endocrine, nervous, and immune systems.19,20 Possible adverse health outcomes include decreased fertility, neurodevelopmental toxicity, and cancer.21–26 Biomonitoring has been conducted in only a few investigations of firefighter exposure to environmental chemicals.6,14,15,27–studies have shown elevated levels of metals and PFCs after responding to an incident.6,15,28 Because we considered firefighters to be a potentially sensitive subpopulation at risk 31 studies have shown elevated levels of PFCs among firefighters,14,32 and occupational for exposure to environmental chemicals, we conducted a biomonitoring study in Southern California firefighters. This paper, on analysis of selected heavy metals and PFCs, is the first publication from this population.

https://www.researchgate.net/publication/270662382_Biomonitoring_in_California_Firefighters_Metals_and_Perfluorinated_ChemicalS

Abstract

To assess California firefighters' blood concentrations of selected chemicals and compare with a representative US population. We report laboratory methods and analytic results for cadmium, lead, mercury, and manganese in whole blood and 12 serum perfluorinated chemicals in a sample of 101 Southern California firefighters. Firefighters' blood metal concentrations were all similar to or lower than the National Health and Nutrition Examination Survey (NHANES) values, except for six participants whose mercury concentrations (range: 9.79 to 13.42 μg/L) were close to or higher than the NHANES reporting threshold of 10 μg/L. *Perfluorodecanoic acid concentrations were elevated compared with NHANES and other firefighter studies. Perfluorodecanoic acid concentrations were three times higher in this firefighter group than in NHANES adult males. Firefighters may have unidentified sources of occupational exposure to perfluorinated chemicals*

Elevated levels of PFOS and PFHxS in firefighters exposed to aqueous film forming foam (AFFF).

Rotander A1, Toms LM2, Aylward L3, Kay M4, Mueller JF5.

https://www.ncbi.nlm.nih.gov/pubmed/26001497

Author information

Abstract

Exposure to aqueous film forming foam (AFFF) was evaluated in 149 firefighters working at AFFF training facilities in Australia by analysis of PFOS and related compounds in serum. A questionnaire was designed to capture information about basic demographic factors, lifestyle factors and potential occupational exposure (such as work history and self-reported skin contact with foam). The results showed that a number of factors were associated with PFAA serum concentrations. Blood donation was found to be linked to low PFAA levels, and the concentrations of PFOS and PFHxS were found to be positively associated with years of jobs with AFFF contact. The highest levels of PFOS and PFHxS were one order of magnitude higher compared to the general population in Australia and Canada. Study participants who had worked ten years or less had levels of PFOS that were similar to or only slightly above those of the general population. This coincides with the phase out of 3M AFFF from all training facilities in 2003, and suggests that the exposures to PFOS and PFHxS in AFFF have declined in recent years. Self-reporting of skin contact and frequency of contact were used as an index of exposure. Using this index, there was no relationship between PFOS levels and skin exposure. This index of exposure is limited as it relies on self-report and it only considers skin exposure to AFFF, and does not capture other routes of potential exposure. Possible associations between serum PFAA concentrations and five biochemical outcomes were assessed. The outcomes were serum cholesterol, triglycerides, high-density lipoproteins, low density lipoproteins, and uric acid. No statistical associations between any of these endpoints and serum PFAA concentrations were observed.

Novel fluorinated surfactants tentatively identified in firefighters using liquid chromatography quadrupole time-of-flight tandem mass spectrometry and a case-control approach.

Rotander A1, Kärrman A, Toms LM, Kay M, Mueller JF, Gómez Ramos MJ.

https://www.ncbi.nlm.nih.gov/pubmed/25611076

National Research Centre for Environmental Toxicology (Entox), The University of Queensland , Coopers Plains, Queensland 4108, Australia.

Abstract

Fluorinated surfactant-based aqueous film-forming foams (AFFFs) are made up of per- and polyfluorinated alkyl substances (PFAS) and are used to extinguish fires involving highly flammable liquids. The use of perfluorooctanesulfonic acid (PFOS) and other perfluoroalkyl acids (PFAAs) in some AFFF formulations has been linked to substantial environmental contamination. Recent studies have identified a large number of novel and infrequently reported fluorinated surfactants in different AFFF formulations. In this study, a strategy based on a case-control approach using quadrupole time-of-flight tandem mass spectrometry (QTOF-MS/MS) and advanced statistical methods has been used to extract and identify known and unknown PFAS in human serum associated with AFFF-exposed firefighters. Two target sulfonic acids [PFOS and perfluorohexanesulfonic acid (PFHxS)], three non-target acids [perfluoropentanesulfonic acid (PFPeS), perfluoroheptanesulfonic acid (PFHpS), and perfluorononanesulfonic acid (PFNS)], and four unknown sulfonic acids (Cl-PFOS, ketone-PFOS, ether-PFHxS, and Cl-PFHxS) were exclusively or significantly more frequently detected at higher levels in firefighters compared to controls. The application of this strategy has allowed for identification of previously unreported fluorinated chemicals in a timely and cost-efficient way.

Firefighters' exposure to perfluoroalkyl acids and 2-butoxyethanol present in firefighting foams.

Laitinen JA[1], Koponen J[2], Koikkalainen J[3], Kiviranta H[2].

Author information

https://www.ncbi.nlm.nih.gov/pubmed/25447453

Abstract

The aim of this study was to assess eight firefighters' exposure to Sthamex 3% AFFF (aqueous film forming foam) in the simulation of aircraft accidents at Oulu airport in Finland. Study was conducted in 2010 before limitation for the use of PFOA and PFOS in AFFFs. Due to prospective limitation also eight commercially available AFFFs were evaluated from occupational and environmental point of view to find substitutive AFFFs for future. The firefighters' exposure to twelve perfluoroalkyl acids (PFAS) was analyzed in order to observe the signs of accumulation during three consecutive training sessions. The firefighters' short-term exposure to 2-butoxyethanol (EGBE) was analyzed by urinalysis of 2-butoxyacetic acid (2-BAA). For the background information also the concentration of PFAS in used AFFF-liquid was analyzed. Fire fighters' serum PFHxS and PFNA concentrations seemed to increase during the three training sessions although they were not the main PFAS in used AFFF. The statistical significance for the elevations was not able to test due to limited size of

test group. In two training sessions, the average urinary excretions of 2-BAA exceeded the reference limit of the occupationally unexposed population. In the evaluations of the firefighting foams, non-fluorine based products were favored and the alcohol resistance properties of foams were recommended for consideration due to the increasing use of biofuel

Perfluoroalkyl acids including perfluorooctane sulfonate and perfluorohexane sulfonate in firefighters.

Jin C1, Sun Y, Islam A, Qian Y, Ducatman A.

https://www.ncbi.nlm.nih.gov/pubmed/21346631

Abstract

OBJECTIVE:
Firefighters were likely exposed to perfluorooctane sulfonate since it was a component of extinguishing foams and perfluorohexane sulfonate (PFHxS), a surfactant coating carpet and other building materials, during firefighting. The objective of the study is to evaluate serum concentrations of perfluoroalkyl acids (PFAAs) in firefighters.

METHODS:
A total of 8826 male adults, including 37 firefighters, were analyzed. Multivariate analysis was conducted by using a general linear model. The least square mean of serum PFAAs was obtained after adjustment for demographic and socioeconomic variables.

RESULTS:
Serum concentration of PFHxS was statistically higher in firefighters both before and after adjustment. Perfluorooctane sulfonate and perfluorononanoic acid were also found higher in firefighters, though not statistically significant.

CONCLUSIONS:
The study suggests that fighting fire can be a risk of exposure to PFAAs, specifically PFHxS

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274321/

Prostate-Specific Antigen and Perfluoroalkyl Acids in the C8 Health Study Population

Alan Ducatman, MD, MS,✉ Jianjun Zhang, MS, and Hongmin Fan, MD

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274321/

Excess prostate cancer is a persistent, unresolved question for firefighters,22–26 who also have workplace exposures to PFAAs

Please read the attached documents that support the knowledge of elevated PFC levels in our nation's firefighting community. YET, NOT ONCE DID DUPONT OFFER UP THE CONCERN TO TEST THE GEAR

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3038253/

https://www.researchgate.net/publication/51719142_Perfluorinated_compounds_in_the_vicinity_of_a_fire_training_area_-_Human_biomonitoring_among_10_persons_drinking_water_from_contaminated_private_wells_in_Cologne_Germany

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274322/

http://www.effua.org/wp-content/uploads/2017/09/Shaw-et-al-FF-Cancer-Poster.pdf

https://www.dhhs.nh.gov/dphs/documents/pease-pfc-blood-testing.pdf

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4724210/

For factors related to consumer product use, we observed significantly higher concentrations of PFOS (p=0.04) and marginally significantly higher concentrations of PFDA (p=0.07), PFOA (p=0.07) and PFHxS (p=0.05) for participants wearing stain-repellant clothes once per week or more (N=9 among 119 individuals responding). In addition, a questionnaire asked if the participant or others in their work environment used products likely to contain PFCs including stain-repellant (like Scotchgard) for sealants or stains (N=1), waxes (N=4), lubricants (N=6), polishes (N=4), fast food packaging (like French fry boxes and paper wrappings) (N=3), paint (N=4), lacquer or varnish (N=2), floor treatments (N=2), or any sort of water- or soil-repellant (N=1). Only half of the participants (9 out of 17) who reported having occupation exposure based on a positive response to use of any of the products above had higher serum concentrations observed (defined as >70th percentile). The occupations of those nine reporting occupational exposure and also having high serum PFC levels included some professions that seemed to plausibly come in contact with these chemicals (tile setter, farmer, house cleaner and dental hygienist) while for others the use was less obvious from the job title (such as elementary school teacher, training supervisor, marriage counselor). Two of these participants did not report their job titles. We suspect it is difficult for participants to identify occupational exposure. We created a variable to label the participants who reported occupational exposure and had elevated serum PFC concentrations as well as participants who had used firefighting foams (N=4, likely nonoccupational exposure as three were employed in office environments and one was retired), as that exposure may confound the impact of other variables. Higher concentrations were observed among people with such exposure. No correlation was observed with the use of non-stick cookware (N=100 among 138

households responding) or the use of stain-repellant for carpet or furniture (*N*=28 among 139 households responding).

Please note, at the time of these studies, the general population of our nation's fire fighters were not aware that their PPE, turnout coats and pants, were impregnated with C8. Possibly during the years 1999-2013, then the changeover C6 and precursors. There were no regulations or guidelines that indicated back stock of textiles treated with PFOA were to be removed from production, or that PPE already on shelves and in manufacturers possession was to be removed from circulation.

****

AUSTRALIA and NEW ZEALAND

https://www.theguardian.com/australia-news/2017/oct/10/foam-contamination-firefighters-must-have-blood-tests-says-commander

Foam contamination: firefighters must have blood tests, says commander

Fire commander Mick Tisbury believes blood of majority of firefighters is contaminated with probable carcinogens

A Victorian fire commander leading the urban brigade's response to the foam contamination scandal has called for firefighters across the country to be given blood tests.

Mick Tisbury, a union executive and acting commander with the metropolitan fire brigade, believes the blood of the majority of firefighters across the country is contaminated with per- and polyfluoroalkyl substances (PFAS), a group of probable carcinogens used in firefighting foam from the 1980s.

Tisbury was a central figure in an inquiry into Pfas contamination at Victoria's Fiskville training facility last year, which found some within the state's country fire authority had known of the site's contamination, but failed to act.

PARLIAMENT OF VICTORIA Environment, Natural Resources and Regional Development Committee

Inquiry into the CFA Training College at Fiskville Special report on production of documents November 2015 ENRRDC Report No. 2, 58th Parliament P

https://www.parliament.vic.gov.au/images/stories/committees/enrc/Fiskville_training_college/INTERIM_REPORT_-_2/ENRRDC_58-02_Report.pdf

AND:

https://www.health.gov.au/internet/main/publishing.nsf/Content/2200FE086D480353CA2580C900817CDC/$File/7.Critical-Review-Pharmacokinetic-Modelling.pdf

Our view differs from the EPA in relation to skin absorption. We suspect that the superb barrier properties of the essentially dead stratum corneum in humans is likely to be a formidable barrier to the ionised PFOS and that it would prevent its percutaneous penetration, irrespective of whether anionic transporters existed in the viable epidermis or not. The same would not necessarily apply to rodent or rabbit skin where there are multitude or hair follicles and a much less well developed and thinner stratum corneum. Indeed, Scott et al. (1986) showed that ionised paraquat does pass through animal skin but not through human epidermis (18). ***PFOA is different in that it is a weak acid and can exist in both the anionic and uncharged forms, with the latter likely to have significant permeation across the human stratum corneum.*** Consistent with these comments, the skin permeability coefficient for PFOA is almost 100 fold different between rat and human skin (19). However, it is unclear from the EPA report what this actually means from a viewpoint of human exposure. The key missing values are the likely unbound concentration of PFOA in whatever aqueous solution people are exposed to and the pH of those solutions. Whilst mortality has been demonstrated in animals (20), with their several orders of magnitude higher skin permeability, the EPA report is deficient in its estimates of the likely human exposure of real world PFOA solutions. In our view, it is likely to be very low relative to that being seen after oral exposure. However, we do support the EPA comments made on lung exposure. The lung epithelia is more permeable than the stratum corneum and so, as has been shown by Rusch et al. (1979), some absorption by lung inhalation may occur (21). PFOA has also been shown to be taken up by the lung after inhalation exposure as shown by Hinderliter et al. (2006) (22).

ECHA

EUROPEAN CHEMICAL AGENCY DOCUMENTS ON PFOA:
https://echa.europa.eu/documents/10162/61e81035-e0c5-44f5-94c5-2f53554255a8

page 35, Surface Treated Textiles B.2.2.5

B.2.2.5 Use of PFOA-related substances in textiles and leather Side-chain fluorinated polymers are widely used in the surface treatment of textiles and leather to provide water, grease, dirt, and oil repellent properties as well as to achieve chemical resistance. These repellents are mainly copolymers of fluoroalkyl acrylates and methacrylate (Lacasse and Baumann, 2004). They are used in numerous textile and leather articles such as sports and outdoor clothing, home textiles and upholstery, carpets, automotive and aviation industry, sun protection / building industry and lifting and carrying belts as well as in the professional sector, e.g. medical garments. Apart from finished articles, PFOA-related substances are also used in impregnating agents for consumer use.
According to industry, the treatment of textiles constitutes the most important use of PFOArelated substances in terms of volume accounting for about 50 % of total market demand. This is plausible as PFOA-related substances (and PFOA presumably as impurity) are widely found in a large variety of textile and leather articles. However, there is no comprehensive and reliable data available to give a complete picture on the volumes of PFOA-related substances used in textiles and leather in the EU. The estimates in the following paragraphs were derived from industry and registration data (see Appendix B.2.2.5 and confidential Appendix for details).

PFOA-related substances for textile and leather treatment are produced within the EU as well as imported into the EU. PFOA-related substances in the EU are mainly used in non-apparel applications, e.g. the manufacturing of technical textiles, furniture, home textiles or automotive industry (Stakeholder Consultation, 2013/14). There is little information available on the volumes of PFOA-related substances used in the EU. Based on registration data as well as on information gained in the consultation with industry it is estimated for further calculations that EU market demand of PFOA-related substances for textile and leather treatment is about 1,000 t/a.

PFOA-related substances are also imported into the EU in finished textile articles, especially in garments, which are predominately manufactured outside the EU (mainly Asia) for the European market (Danish Environmental Protection Agency, 2013; Stakeholder Consultation, 2013/14). There is very little information on the total volumes of PFOA-related substances in imported textile and leather articles. Based on industry information it is estimated that imported textile articles contain 1,000-10,000 t/a of PFOA-related substances to be used for further calculations.

PAGE 41 B.4.1.2 Degradation of PFOA-related substances

PFOA-related substances degrade to PFOA under environmentally relevant conditions, and are therefore included in this proposal. The following text describes how this occurs. **According to REACH, if transformation/degradation products with PBT properties are being generated, the substances themselves must be regarded as PBT substances ("The identification shall also take account of the PBT/vPvB-properties of relevant constituents of a substance and relevant transformation and/or degradation products." REACH Annex XIII). Therefore, PFOA-related substances are PBT-substances as well. The number of PFOA-related substances on the market seems to be high. Some examples are given in Appendix B.1. Available degradation studies are described in chapter B.4.1.2 and are summarised in Table A.B.4-1 in Appendix B.4.1.**

PFOA-related substances all show a similar structural feature. The non-degradable perfluorinated carbon chain (C8F17-X) attached to a degradable non-fluorinted moiety. Thus, the substances are structurally similar. Using the weight of evidence approach it seems very likely that also similar substances may degrade in a similar way in the environment. At the end of a number of degradation steps PFOA may most probably be the end product and persist in the environment.

B.4.1.2.1 8:2 FTOH

8:2 FTOH metabolism universally show the formation of perfluorooctanoate (PFOA) and, to a smaller fraction, perfluorononanoate (PFNA) and lower-chain-length PFCAs etc etc etc.....

In conclusion, 8:2 FTOH mainly degrades to PFOA in sludge, soil, water and air. In vertebrates, PFOA is the main perfluoric acid formed by biotransformation of 8:2 FTOH. Emission and exposure of 8:2 FTOH will add to the overall blood concentration of PFOA in human blood stream

PAGE 51 B.4.1.2.5 Conclusion on degradation of PFOA-related substances

In conclusion, all the presented PFOA-related substances are degraded to PFOA and shorter chain PFCAs by abiotic and biotic processes in the environment. For those substances where no degradation studies are available it can be assumed that based on the chemical similarity the substances will most probably be degraded in a similar way. Thus, based on the weight of evidence approach PFOA will most probably be released in the environment. Hence, these substances need to be considered as important sources of PFOA in the environment. Furthermore, they need, according to REACH, be considered as PBT-substances as well.

https://echa.europa.eu/documents/10162/61e81035-e0c5-44f5-94c5-2f53554255a8

B.4.4.3.1 Environmental release from fire-fighting foams

PFOA-related substances are used in aqueous fire-fighting foams (AFFF), which are mostly directly applied outside, reaching the sewage system or/ and leach into soil and groundwater. The composition of AFFF is diverse and has been changed over time. In chapter B.2.2.6 it has been estimated that 50-100 t/a PFOA-related substances are used for AFFF. PFOA can be contained as unintended by-product. Posner et al. have conducted a study to describe the use ANNEX XV PROPOSAL FOR A RESTRICTION – Perfluorooctanoic acid (PFOA), PFOA salts and PFOA-related substances 80 and occurrence of PFASs in the Nordic countries (Posner et al., 2013). They report that according to the fire-fighting foam industry that has been contacted during the project, the most common fluorosurfactant used in fire fighting foams since the discontinuation of PFOS based surfactants is the substance C8-C20-γ-ω-perfluoro telomer thiols with acrylamide (CAS number 70969-47-0). According to industry most of the manufacturers have committed to continue use of this substance until 2016. According to ECHA Guidance R.16 releases from the formulation of mixtures results in 2.5% release to air, 2% to water and 0.01% to soil. For the estimated used volumes environmental emissions from the formulation of AFFF would account for about 2.25 - 4.5 t/a if the sum of the release percentages, i.e. 4.51 %, is taken and multiplied by 50 and 100 t/a, respectively. The sum of release factors was taken as worst-case assumption instead of the highest release factor because no dominant emission pathway was identified. When AFFF are applied it is assumed that 100% of the remaining amount will be emitted to the environment as a worst case estimate. This assumption seems reasonable since the fire-fighting foam will not be incinerated during an event of fire. However, it has to be noted that large amounts of AFFF are stored in stock and will only be used in exceptional cases. No information is available on these amounts of AFFF in stock and the actual fraction thereof used. FOEN (Federal Office for the Environment, 2009) estimated environmental PFOA releases from AFFF in 2007 were 11.55 kg/a in Switzerland (compared to other applications the share was 33% of total emissions). However, the situation might have changed to a large extent since 2007. A lot of data are available on events of damage by PFASs, mainly related to the use of firefighting foam including costs of remediation in Germany (data from Federal States)11 . The German federal state North Rhine-Westphalia has investigated per- and polyfluorinated surfactants in extinguishing water (Hähnle, 2013). Among others, they found PFOA in concentrations up to 3.8 µg/L. After an event of fire they detected 15,000 µg/LPFOA in the used fire-fighting foam (Hähnle, 2013). Posner et al report that in sediments close to a company that manufactures fire-fighting foams the concentrations of PFCAs were particularly high (Posner et al., 2013). PFOA concentration accounted for 101 ng/g. The important impact of local sources such as the fire-fighting foam used in airports has been proven to contaminate adjacent soils, groundwater and other environmental compartments. In particular, this can be seen in the comparison between background soils close to the major Oslo airports (Norway) and soils from the airport areas. For background soils, in Rygge (Norway) and Gardemoen (Norway), PFCAs were not detected, whereas soils from the airports exhibited higher concentrations, particularly those from Gardemoen. In the latter, concentration of PFOA was around 4 ng/g (Klif Report TA2444/2008, cited in (Posner et al., 2013)). Further examples of damage events from the use of fire-fighting agents and according remediation costs are given in table A.F.1-1 in Appendix F. Conclusion Although it has been reported that there has been a shift to short-chain chemistry PFOArelated substances are still used in AFFF. Moreover, PFOA might be contained as impurity in aqueous fire-fighting foams. Due to stored volumes in stock, it is assumed that

even though 11 It is not always clear, whether concentrations of PFOA and PFOA-related substances in the environment originate from previous or relevant current use. ANNEX XV PROPOSAL FOR A RESTRICTION – Perfluorooctanoic acid (PFOA), PFOA salts and PFOA-related substances 81 the use of PFOA-related substances has decreased, further emissions are expected to occur at a later pointwhen these stored volumes come into use. The application of fire-fighting foams will in most cases lead to considerable amounts released to the environment as it was shown by measured concentrations in the environment after such events.

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B.4.4.3.2 Environmental release from surface-treated textiles

Side-chain fluorinated polymers are used for example as stain and soil repellents for textiles (for further information on use see chapter B.2.2.5). Treatment of textiles In B.2.2.5 it has been estimated that up to 1000 t/a PFOA-related substances are used for textile treatment within the EU. PFOA and PFOA-related substances present in fluorotelomer-based products are likely released to air (Buck et al. cited in Prevedouros et al., 2006) and wastewater during industrial application of fluorotelomer-based products to textiles. According to ECHA Guidance R. 16 ERC 5 (industrial inclusion into or onto a matrix) can be assigned for the treatment of textiles (50% released to air, 50% to water, and 1% released to soil). Since PFOA-related substances are likely released to air, a worst case overall emission factor of 50% has been used for the following calculation. Moreover, it was estimated that 2% of PFOA-related substances are not bound to the side-chain fluorinated polymers which would result in (50% x 2% x 1000 t/a =)10 t PFOA-related substances annually released to the environment. The 2 % were derived from Russel et al. (2008), see above Regarding emissions to wastewater, it can be seen from measured data that PFOA is emitted from textile industry into water: Clara et al. (2008) have tested two effluents from textile industry. PFOA has been measured in the range of 1.4 - 76 ng/L. However, no measured data are available on PFOA-related substances. Although no data is available on the degree of fixation during the finishing process, a worstcase emission calculation could comprise the same estimates as for the releases to air (see above) and thus result in the release of 10 t/a PFOA-related substances. However, since it is shown in the following described studies that large amounts of PFOA-related substances are released in subsequent life-cycle steps it is assumed that 50% of the unbound fraction will be released during industrial use and the remaining 50% during use and disposal of textiles. Use of textiles Beside the amount of PFOA-related substances used for textile treatment in the EU (10 t/a remaining in textile after finishing), it has been estimated that 1,000 - 10,000 t/a of these substances are imported annually into the EU in outdoor jackets (see chapter B.2.2.5). It is assumed that amounts of PFOA-related substances have been already emitted during the manufacturing of textiles outside the EU. Here it is estimated as well that 50% of the PFOArelated substances not bound to the polymer matrix remain in the textiles and will be released during service-life, resulting in additional emissions of 20 - 200 t/a from imported textiles. Taking the respective ERC into account (ERC 10b: Wide dispersive outdoor use of long-life articles, high or intended release: 100% to air, 100% to water, 100% to soil), a worst-case emission would be 100% to all environmental compartments. In contrast to outdoor use, the ANNEX XV PROPOSAL FOR A RESTRICTION – Perfluorooctanoic acid (PFOA), PFOA salts and PFOA-related

substances 82 ERC for indoor use would result in much lower release factors (ERC 11a: Wide dispersive indoor use of long-life articles with low release: 0.05% to air, 0.05% to water) which cannot fully be related to real use patterns of e.g. outdoorjackets and thus is less valid than the worst-case assumption of outdoor use. During the use of textiles the polymer or textile fibres can be abraded from the textile surface during laundering and are subsequently discharged into wastewater (Russell et al., 2008). However, the type of textile has a great influence on the emission pattern, since the frequency of washing can vary significantly; e. g. clothes are probably washed more often than upholstery or interior textiles in cars (Brooke et al., 2004 cited in Federal Office for the Environment (FOEN), 2009). **As treated textiles such as outdoor jackets are worn outside and emissions from textiles in vehicles will be released to outdoor air, it can be considered that all residuals will be emitted to the atmosphere during service life as a reasonable worst case (Federal Office for the Environment (FOEN), 2009). Experiments reveal that considerable amounts of PFOA and FTOHs will be released during service life. It has been shown that the investigated outdoor materials contained PFASs in relatively high concentrations (Kotthoff et al. 2015; Schlummer et al. 2013). 8:2 FTOH was the dominating congener of the analyzed FTOH regarding contents and 8:2 FTOH emissions from 8 products ranged from 16.9-494 ng/m³ (see Table A.B.4-7 in the Appendix). 1.5 - 4% of the initial amounts of the analytes which were originally present in the test desiccator were emitted during 3 hours using a high air exchange rate of 116 per hour. Based on that, total FTOH emissions into the environment were calculated to be 8 - 200 ng/h. Knepper et al. (2014) determined PFASs between 0.03 - 719 µg/m2 in all Durable Water Repellent (DWR) jackets tested (purchased in 2012). PFOA was contained in all DWR jackets, although at lower concentrations (0.02 - 171 µg/m²) compared to FTOHs. Within the same project, evaporation and washing was simulated to assess releases from the jackets, including freshly impregnated textiles. 8:2-FTOH was found in all air samples in concentrations from 3.46 - 90.6 µg/m² after 5 days. Two separate washing experiments were conducted using four different jacket pieces at once each time in order to trace additional releases of PFASs into washing water. Washing experiments revealed highest releases of > 200% for PFOA although internal standards had been applied, when summing up releases from the first and second wash cycle. However, it cannot be concluded on whether PFOA originates from residues in fluoropolymer manufacture or from the degradation of PFOA-related substances. Moreover, the release of volatile PFASs from the wearing of outdoor jackets was simulated based on the ratio between concentrations measured by solvent extraction of jackets and concentrations measured in the air (µg/m2).** It has been shown that 6.51-17.6% 8:2 FTOH were emitted. It was shown that DWR jackets contribute as one particular source among many others to the overall emission of PFOA and PFOA-related substances (Knepper et al., 2014). Also FOEN (2009) estimated that PFOA-related substances are emitted in considerable amounts from textile protection and impregnation agents. They calculated 8:2 FTOH emissions to the atmosphere for Switzerland in 2007 from textile protection and impregnation agents to be 0.3 - 0.9 t/a, respectively. Environmental release of PFOA from washing of textiles has also been shown for professional applications. Clara et al. (Clara et al., 2008) tested two laundry and cleaning sites where PFOA was found in concentrations of 6.5 - 59 ng/L.

(Imagine if we knew the actual chemical content of our impregnated PPE from 1999 – 2013?)

End-of-life When not emitted during service-life, it is assumed that emissions might also arise from the end-of-life phase of textiles. Textiles are disposed off together with municipal solid waste from households, which might be collected and reused. It is however expected that EU-wide incineration and landfilling are the most common disposal routes. Although incineration might destroy PFOA, a final conclusion cannot be made since insufficient information is available on the behaviour of PFOA and PFOA-related substances during the incineration process (see chapter B.4.4.4). In case, textiles containing PFOA or PFOA-related substances end up on landfills, especially in those EU countries with no incineration capacities, large uncertainties exist regarding the degradation of side-chain fluorinated polymers (see chapter B.4.1.2.4). Therefore, emissions might be higher, although potentially with lag in time.

Conclusion The treatment of textiles is considered a major use of PFOA-related substances, leading to environmental releases. Moreover, as it can be seen from different experiments and measured product contents surface-treated articles represent a relevant source of PFOA and PFOArelated substances in the environment during their use phase. Moreover, emissions during their end-of life phase cannot be excluded.

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The exposure scenarios identified in humans are as follows • Long term/life-long oral intake of PFOA from water, diet or dust (general population) • Manufacturing products containing PFOA (workers) Based on the identified health effects related to PFOA exposure, and the expected exposure scenarios relevant for the general population or the workers, the following DNELs need to be derived: • General population-DNEL • Workers–DNEL First, an overview of selected toxicological studies in animals with respect to type of study, endpoints and the associated LOAEL or NOAELs are given in Table B.5-1. The studies selected for DNEL derivation was scored according to Klimisch and all studies were rated to a score of 2.

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B.5.3.2 Occupational exposure

B.5.3.2.1 Fluoropolymer production workers As described in chapter B.2.3, a major industrial use of PFOA and the ammonium salt APFO, has been as a processing aid in the manufacturing process of several fluoropolymers. Under some workplace conditions its acid form, PFOA, may also be present. Sublimation from surfaces and volatilization from aqueous solutions can be pathways for worker exposure to PFOA (Kaiser et al., 2010). Even when operations are not running, residual material on surfaces in the work area may result in measurable airborne concentrations.

Intake using the external dose approach In a study by Kaiser et al. (Kaiser et al., 2010) both measured and modelled results suggest that sublimation from dry surfaces may lead to higher airborne concentrations than volatilization from aqueous solution (Kaiser et al., 2010). Measured average air concentrations of PFOA near the process sumps were in the range 0.004 to 0.065 mg/m3 depending on the water content and pH in the sumps. Using an inhalation rate of 10 m3 /8 hour (Guidance on information requirements and chemical safety assessment Chapter R.8: Characterisation of dose [concentration]-response for human health), the intake from inhalation of occupational air is 0.040 to 0.65 mg/day or 571 to 9286 ng PFOA/kg bw/day when assuming a body weight of 70 kg.

Intake using the internal dose approach Very high serum concentrations of PFOA have been reported in fluoropolymer production workers (see Table B.5-10). Using these data, median concentrations based on the mean and max concentrations reported in the single studies were calculated to be 1750 ng/mL and 11,850 ng/mL, respectively. Using a one-compartment steady-state pharmacokinetic model as described in chapter B.5.3.1, the intakes back-calculated from the serum concentrations were in the range 0.8 to 13189 ng/kg bw/day with an overall mean intake of 298 ng PFOA/kg bw/day

Table B.5- 10: Serum concentrations of PFOA (ng/mL) in occupationally exposed workers (Fromme et al., 2009) and intakes (ng/kg bw/day) back-calculated using a one-compartment steady-state pharmacokinetic mode

See tables page 118 – 119

B.5.3.2.2 Professional skiwaxers In winter sports such as cross-country skiing, downhill skiing and biathlon, ski waxes are applied to the skis to increase performance. Professional ski team waxers are exposed to aerosols and to some extent vapours when working in poorly ventilated small cabins during the skiing season from November until March, in particular when applying gliders. Waxes with different chemical characteristics fit different snow and temperature conditions, and can crudely be divided into gliders and grip waxes. The exact composition of gliders is rarely disclosed by the producers. However, modern gliders, available as solid blocks or as powders, consist mainly of petroleum-derived straight-chain aliphatic hydrocarbons with 20-80 carbon atoms and perfluoro-n-alkanes (PFAs), that is, alkanes with 12-24 carbon atoms where all hydrogen are substituted by fluorine (Ludwig, 1995, Gambaretto et al., 2003). In a recent study, concentrations of PFOA were determined in 11 different glider powders and 11 fluorinated solid blocks from six different manufacturers (Freberg et al., 2010). Perfluorinated carboxylic acids were detected in all samples. The median concentration of PFOA was 0.68 µg/g product in the solid block gliders and 2.7 µg/g product in the powders. Semifluorinated nalkanes (SFAs) have also been found in high concentrations in skiwax (Plassmann and Berger,

2010), and these chemicals are hypothesised to degrade to FTOHs and PFCAs in the environment (Plassmann, 2011).

Intake using the external dose approach In a study by Freberg et al., 2010, PFOA concentrations were determined in six air samples collected in ski waxing cabins during performance of work tasks resulting in occupational exposures. The instrument used to collect the samples was designed to simultaneously collect the three health related aerosol fractions; the coarser inhalable fraction, the thoracic fraction

and the respirable fraction. All perfluoroalkyl carboxylates (PFCAs) with chain lengths from C4 to C14 were found in the samples, and the concentrations were similar in all three fractions. The median (range) concentrations of PFOA were 11 (8-38), 12 (10-44) and 14 (11-52) ng/m3 in the respirable, thoracic and inhalable fractions.

Intermediate scenario, professional skiwaxers According to "Guidance on information requirements and chemical safety assessment Chapter R.8: Characterisation of dose [concentration]-response for human health" an inhalation rate of 10 m3 /8 hours is to be used for workers. Concentration of PFOA in the respiratory air fraction (the fraction that may penetrate to the alveoli of the lung): 11 ng/m3 (median value) This gives an intake from inhalation of occupational air is 110 ng/day or 1.57 ng/kg bw/day when assuming a body weight of 70 kg.

High exposure scenario, professional skiwaxers According to "Guidance on information requirements and chemical safety assessment Chapter R.8: Characterization of dose [concentration]-response for human health" an inhalation rate of 10 m3 /8 hours is to be used for workers. Concentration of PFOA in the respiratory air fraction (the fraction that may penetrate to the alveoli of the lung): 38 ng/m3 (max value) This gives an intake from inhalation of occupational air of 380 ng/day or 5.4 ng/kg bw/day when assuming a body weight of 70 kg.

Intake using the internal dose approach Two Nordic studies have reported elevated concentrations of PFOA in serum from professional skiwaxers with a median concentration of 112 ng/mL whole blood (range 4.8 – 535 ng/mL) in the Swedish study (Nilsson et al., 2010) and 50 ng/mL serum (range 20-174 ng/mL) in the Norwegian study (Freberg et al., 2010). Since the PFOA concentration measured in whole blood is half of the serum concentration, the published figures in the Swedish study need to be multiplied with two in order to compare with the Norwegian study, giving a median serum concentration of 224 ng/mL (range 9.6 – 1070 ng/mL). The average serum concentration in the two ski waxing studies is 137 ng/mL serum ((50+224)/2). The average of the maximum concentrations of the two Nordic studies (Nilsson et al., 2010; Freberg et al., 2010) is calculated to be 622 ng/mL ((1070+174)/2), and is considered as a realistic worst case scenario.

Using the PK model as described above, the intakes back-calculated from the serum concentrations (whole blood concentrations multiplied by a factor of two) were in the range 0.46 to 124 ng/kg bw/day with mean intakes of 26 ng/kg bw/day and 5.8 ng/kg bw/day for the Swedish and the Norwegian study, respectively, giving an average of 16 ng/kg bw/day. These back-calculated intakes are in a similar range as those calculated using the external dose approach, indicating that the intakes are reasonable.

B.5.3.2.3 Semiconductor workers We describe the use of PFOA in the semiconductor industry in chapter B.4.4.2.3. Inside the semiconductor wafer manufacturing clean room, automated chemical delivery systems are installed to create a barrier between workers and the process and protect against chemical and physical hazards in the work environment (comment in public consultation from European Semiconductor Industry Association). Van der Putte et al. (van der Putte et al., 2010) also describes that there is no potential for exposure to the work place employee in the semiconductor industry.

B.5.3.3 Consumer exposure Consumer exposure includes exposure from house dust, indoor air as well as dermal or oral contact with consumer products. PFOA might

be leaching from consumer products into house dust as well as both indoor and outdoor air, and thus ingestion of house dust and inhalation of air in both gas and particulate phase are potential exposure sources for PFOA. Exposure to PFOA can also occur through direct contact with consumer products such as all-weather clothing and textiles.

(I believe we are have much higher exposure than a 'consumer' but wished to highlight this exposure issue d.c.)

When considering risk for the general population, it is the total exposure (exposure from all sources) that is important to compare with the calculated DNELs. For that reason only the total exposure, as opposed to breaking down the exposure in different pathways, has been presented here. For further explanations see chapter B.5.3.5.

In background exposed populations, exposure to PFOA from air occurs primarily through inhalation of neutral polyfluorinated alkyl substances (PFAS) such as FTOHs (Stock et al., 2010). Concentrations of FTOHs in indoor air usually exceed the concentrations in outdoor air considerably (Harrad et al., 2010). Due to the low concentrations in outdoor air, exposure through inhalation of air is mainly through indoor air.

Ingestion of house dust is an exposure source for PFOA. As for indoor air, the concentrations in house dust are quite variable. The distribution pattern is often following a lognormal distribution, with some samples having concentrations far exceeding the mean and median values of the dataset (Harrad et al., 2010).

Dermal exposure to PFOA can occur through direct contact with consumer products. Use of PFOA-related substances in surface-treated textiles and leather is described in chapter B.2.2.5. Three surveys have been conducted in Norway to explore ranges of PFASs in clothing (SFT 2006; Grønn hverdag 2010; Schulze and Norin 2006) and both ionic and neutral PFASs were detected and PFOA were among the ionic PFASs detected. PFOA has also been found in carpets and textiles (Washburn et al., 2005), waxes and paints (Washburn et al., 2005), food contact

materials (Begley et al., 2005) and non-stick cookware (Sinclair et al., 2007). The dermal absorption of ionic PFASs has been thought to be low (e.g. the dermal absorption of ammonium perfluorooctanoate was only 0.048% (Fasano et al., 2005), thus this pathway has been thought to give only a minor contribution to the intake of PFASs. In a paper by Trudel et al., 2008, the authors were modelling the importance of different exposure pathways to PFOA. They found that the contribution to the total uptake dose was less than 1% in any of the scenarios for dermal exposure from wearing of treated clothes, from deposition of spray droplets on skin while impregnating, from skin contact with treated carpet and with upholstery, and from deposition of dust on skin. However, a more recent study

indicates that the potential for dermal absorption is significant in both mouse and human skin and emphasizes that the extent of dermal absorption of PFOA is dependent on its ionization state. These results raise concern regarding the possibility for dermal exposure in both occupationally exposed individuals and the general population (Franko et al., 2012).

B.5.3.4 Indirect exposure of humans via the environment

Indirect exposure of humans via the environment includes exposure from food and beverages, drinking water and inhalation of outdoor air. In general, food might be polluted with PFASs present in the environment. Meat etc. can also be contaminated through animal feed. Further, it has been demonstrated that PFASs can migrate from food packaging and non-stick cookware which thus represents additional sources of exposure from food (Begley et al., 2005; Sinclair et al., 2007). Both ionic and neutral PFASs have been determined in samples of food as summarised by Egeghy and Lorber (2011), Fromme et al. (2009) and Vestergren and Cousins (2009). Ionic PFASs have in general been found in highest concentrations in samples of fish and shellfish (Ericson et al., 2008a;Tittlemier et al., 2007), while the highest amounts of perfluoroalkyl sulfonamides (FOSAs) have been observed in composite samples of fast food (Tittlemier et al., 2006). In a recent study within the EU project PERFOOD, in total 50 composite samples from 15 food groups collected in four different countries (Belgium, Czech Republic, Italy and Norway) were analysed. PFOA was found above the method quantification limit in 24% of the samples. The concentrations were between 4.99 and 49.5 ng/kg sample with a median concentration of 9.14 ng/kg (Hlouskova et al., 2013).

Dietary intakes of PFOA are often estimated by multiplying the consumption (g/day) obtained from questionnaires with the PFOA concentrations in the respective food (e.g. Ericson et al., 2008a, Haug et al., 2010a). But PFOA intakes have also been estimated using concentrations determined in duplicate diet samples (e.g. Fromme et al., 2007, Kärrman et al., 2009). In a recent study within the EU project PERFOOD, the dietary exposure to selected PFAAs (perfluorinated alkyl acids; carboxylates, sulfonates and phosphonates) was estimated in four selected European countries (Belgium, the Czech Republic, Italy and Norway) representing Western, Southern, Eastern and Northern Europe (Klenow et al., 2013). Foods of plant origin (e.g. fruit and vegetables) were the most important for the dietary exposure to PFOA. Mean dietary exposure estimates for PFOA (using an upper bound approach where all values below the LOQ were considered to be equal to LOQ) were calculated between 0.107 and 0.231 ng/kg bw/day for adults. For children (3-9 years of age), the mean dietary exposure estimates were calculated between 0.195 and 0.389 ng/kg bw/day. The European Food Safety Authority (EFSA) has recently published a scientific report on dietary exposure estimates of PFASs for Europeans. For adults, the highest upperbound mean estimate of dietary exposure to PFOA, taking 13 different European countries into account, was 4.3 ng/kg bw/day, while the highest 95% percentile estimate was 7.7 ng/kg bw/day (EFSA, 2012).

Few data are available on time trends of PFOA concentrations in food. However, in a recent Swedish study where PFOA was determined in archived food market basket samples, increasing concentrations were observed in the period 1995 to 2010. In that study, intakes of 0.348, 0.495 and 0.692 ng/kg bw/day were found in the samples from 1999, 2005 and 2010, respectively (Vestergren et al., 2012).

B.5.3.5 Combined human exposure assessment

The combined human exposure assessment considers exposure from all sources (both sources of consumer exposure and indirect exposure of humans via the environment as described in chapter B.5.3.3 and B.5.3.4. Based on available exposure data from the literature, total intakes have been estimated for PFOA in general populations (Egeghy and Lorber 2011; Fromme et al., 2009; Trudel et al., 2008; Vestergren and Cousins, 2009; Cornelis et al., 2012). In these studies, intakes have been estimated based on various scenarios by changing the concentrations in the exposure media (e.g. high or low concentration in drinking water) and the exposure factors (e.g. high or low dust ingestion rate). In addition, a Norwegian study by Haug et al. (2011) considers multiple exposure sources on an individual basis (Haug et al 2011). Total intakes from the mentioned studies are presented in table B.5-11. The various studies listed had different approaches for estimating the total exposure. For instance, Trudel et al (2008), estimated intakes based on low, intermediate and high scenarios, while Vestergren and Cousins (2009) estimated intakes based on scenarios which they call background exposure, high drinking water exposure, point source drinking water exposure and occupational exposure. Cornelis et al (2012), estimated average and P95 intake for PFOA from air, dust, soil and diet. However, as complementary studies, the studies in table B.5-11 give a good picture of the variability in exposure that can be expected both in an intermediate/median exposure scenario as well as in a high exposure scenario.

Estimates given high drinking water exposure and point source drinking water exposure are considered relevant to include for the high exposure scenario. The rationale behind this is that releases in drinking water might affect large general populations and this is not unlikely to happen, especially since not all sources and uses of PFOA are known. Thus, accidental exposures giving higher serum/plasma concentrations are not neglected in the risk evaluation of a worst case scenario.

See tables pages 123- 124

A breast fed infant will be exposed to considerable amounts of PFOA during the first months of life. A median daily intake of 4.3 ng PFOA/kg bw/day was estimated for breast-fed infants in a recent Norwegian study, and consumption of breast milk was found to be the major source of exposure for these infants (Haug et al., 2011). The total exposure to PFOA for infants was around 15 times higher than the corresponding estimates for adults. The considerable exposure of infants through breast feeding is also supported by the decreasing concentrations of PFOA in breast milk during the course of lactation, seen in a depuration rate study (Thomsen et al., 2010). In a study from Germany, median PFOA levels in cord blood were reported to be 1.7 ng/mL and in blood of 6 month old infants the corresponding level was 6.9 ng/mL (Fromme et al., 2010). PFOA concentrations in infant serum at 6 months of age were 4.6 times higher than in maternal serum at delivery. Further, for all subjects, increasing PFOA concentrations were seen during the first 6 months of life, and most subjects showed a clear decrease in the following months. Based on the table above, the total exposure estimates for the general population are as follows:

Total exposure estimate, intermediate/median scenario

Adults: the intakes of PFOA are in the range 0.26 to 6.1 ng/kg bw/day Children ≥ 2years and teens: the intakes of PFOA are in the range 2.6 to 20.1 ng/kg bw/day Children < 2 years: the intakes of PFOA are in the range 4.3 to 9.8 ng/kg bw/day

Total exposure estimate, high scenario (e.g. high drinking water concentration, high dust concentrations)

Adults: the intakes of PFOA are in the range 4.1 to 44 ng/kg bw/day Children ≥ 2years and teens: the intakes of PFOA are in the range 53 to 72 ng/kg bw/day Children < 2 years: the intakes of PFOA are in the range 83 to 114 ng/kg bw/day

Adults Food is generally the major source of exposure for background exposed adults (Egeghy and Lorber 2011; Fromme et al., 2009; Trudel et al., 2008; Vestergren and Cousins 2009, Haug et al., 2011). However, on an individual basis, the indoor environment can account for up to around 50% of the total intake (Haug et al., 2011). Further, drinking water exposure is dominant for populations near sources of contaminated drinking water. The role of PFOArelated substances in the total exposure to PFOA is still not clear. Vestergren et al. 2008 found that in an intermediate scenario 2 - 8% of the PFOA exposure could be attributed to exposure from PFOA-related substances, while in a high exposure scenario the PFOA-related substance exposure could be as high as 28 - 55%.

B.5.3.5.2 Intake using the internal dose approach

The internal dose reflects an integrated exposure over time comprising various sources and pathways, and it also takes individual differences into consideration (e.g. age and gender). In Table B.5-12 examples of serum/plasma concentrations in the general European adult population are given, and in Table B.5-13, examples of serum/plasma concentrations of PFOA (ng/mL) in children world-wide are summarised. Further, in Table B.5-14 examples of serum concentrations of PFOA (ng/mL) in cord blood world-wide are reported. All together these data give a good overview of internal doses as well as the prenatal exposure of PFOA in the general population

In year 2000, a phase-out of production of "perfluorooctanyl" compounds was announced by the main US manufacturer, 3M (3M Company 2000). Subsequently, the US Environmental Protection Agency requested eight manufacturers to voluntarily eliminate their production and use of perfluorooctanoate (PFOA), its precursors and related chemicals (US EPA 2006). These measures were thought to lead to decreasing concentrations of among others PFOA in human blood

Several studies have explored time trends of PFOA concentrations in blood. In some studies a decrease from around year 2000 have been observed e.g. Germany (Schröter-Kermani et al 2013; Yeung et al 2013), Norway (Haug et al., 2009; Nøst et al., 2014), Australia (Toms et al., 2009), Sweden (Glynn et al., 2012; Sundström et al., 2011; Axmon et al., 2014), USA (Calafat et al 2007; Olsen et al., 2008; Olsen et al., 2012; Wang et al., 2011), Japan (Okadaa et al., 2013; Harada et al., 2011). In other studies the blood concentrations of PFOA have been quite stable the last decade e.g. Greenland (Long et al., 2012), Japan (Harada et al., 2007, Harada et al., 2010), USA (Kato et al., 2011), Korea (Harada et al., 2011).

In a study by D'eon and Mabury (2011) the relatively slow decrease of PFOA concentrations in blood compared to the expected decrease based on the measured intrinsic elimination half-life in humans, is

suggested to be caused by continued PFOA exposure, either through direct or indirect exposure. A recent study by Gebbink et al. (2015) demonstrates a significant increase between 1997 and 2012 in the % linear isomer PFOA and FOSA in Swedish human serum. Thus, taking measures to reduce exposure to PFOA is as important today as it was some years ago.

Table B.5- 12: Examples of serum/plasma concentrations of PFOA (ng/mL) in the general European adult population and back-calculated intakes using a one-compartment steady-state pharmacokinetic model

See tables pages 126 - 127

Based on the back-calculated intakes above, the total exposure to PFOA for the general European adult population is between 0.01 to 12 ng/kg bw/day. This is within the range of the intake calculated using the external dose approach, indicating that the intakes are reasonable.

B.5.3.6 Summary and discussion of human health exposure assessment

Based on the external dose approach, the total exposure to PFOA for the general adult population in an intermediate/median scenario varied between 0.26 and 6.1 ng/kg bw/day and for children the external dose varied between 2.6 and 20.1 ng/kg bw/day. Similar intakes were also obtained when back-calculating intakes from the measured blood concentrations, with total exposure to PFOA for the general European adult population is between 0.01 to 12 ng/kg bw/day. This indicates that the intakes are reasonable. In a high exposure scenario the intakes for the general European adult population varies between 4.1 and 44 ng/ kg bw/day and for children the range is between 53 and 114 ng/ kg bw/day. This is in the same range as the exposure to professional ski waxers back-calculated from the serum concentrations (0.46 to 124 ng/kg bw/day) with a mean intake of 16 ng/kg bw/day. The back-calculated intakes from serum concentrations for occupationally exposed workers were in the range 0.8 to 13189 ng/kg bw/day with an overall mean intake of 298 ng/kg bw/day

The internal serum concentration reflects an integrated exposure over time comprising various sources and pathways, and it also takes individual differences into consideration (e.g. age and gender). The internal concentration is easy to obtain due several different cohorts available, compared to calculating the external exposure as PFOA comes from many different sources. Thus, the internal PFOA serum/plasma concentrations have been used in the risk characterisation**. Concentrations of PFOA in occupationally exposed workers have been reported to be in the range of 1750 to 11850 ng/mL (Table B.5-10), a mean serum concentration of 137 ng/mL was calculated based on two Scandinavian studies, but concentrations up to 1070 ng/mL was reported (chapter B.5.3.2.2).** Many studies in Europe as well as around the world have measured PFOA concentrations in human serum/plasma of general populations. Concentrations in populations exposed to high drinking waterconcentrations are considered relevant to include for the high exposure scenario as releases in drinking water might affect large general populations and this is not unlikely to happen, especially since not all sources and uses of PFOA are known. Serum concentrations of PFOA in the European adult population are found in the range from 0.1 to 100 ng/mL (Table B.5- 12). Using the data in Table B.5-12, mean concentrations based on the median and max concentrations reported in the single studies were calculated to be 3.5 ng/mL and 21 ng/mL, respectively. Serum levels of PFOA in children world-wide has been reported to be in the range 0.3 to 22 ng/mL (Table B.5-13), with the exception of children that have been drinking heavily

contaminated drinking water. In this case the highest serum concentration was 1283 ng/mL. Mean concentrations based on the median and max concentrations reported in the single studies, excluding two studies where the children have been exposed to PFOA through consumption of drinking water (Mondal et al., 2012; Höltzer et al., 2008), were calculated to be 2.5 ng/mL and 9.7 ng/mL, respectively. Mean concentrations based on the median and max concentrations reported in the single studies including the two studies where the children have been exposed to PFOA through consumption of drinking water (Mondal et al., 2012; Höltzer et al., 2008) were calculated to be 6.4 ng/mL and 108 ng/mL, respectively. PFOA concentrations in both cord blood have been measured in a few studies world-wide and the mean concentrations based on the median and max concentrations reported in the single studies (Table B.5-14) were calculated to be 1.3 ng/mL and 4.1 ng/mL, respectively.

PAGE 183

https://echa.europa.eu/documents/10162/61e81035-e0c5-44f5-94c5-2f53554255a8

Textiles for personal protection equipment in the professional sector derogated until 2020

During stakeholder consultation it was indicated by some companies that substitution of PFOA and PFOA-related substances is not yet possible for textile applications requiring high technical performance, e.g. combined high water- and oil-repellency and chemical resistance, because with alternatives these demands cannot be fulfilled. Such textiles are used for workers protection clothing, like work wears for oil drilling, fire fighting, military and surgery. Furthermore, for filter materials for oil and fuel filtration it was reported that no alternatives are available. At the same time other companies report the availability of alternatives (short chain fluorinated chemicals) in high performance areas, e.g. personal protection equipment and automobile industry. Overall, it cannot be fully assessed whether derogation is justified for the use of PFOA and PFOA-related substances in the professional sector due to data gaps mainly on volumes, specific uses and substances. It has to be kept in mind that every exemption contributes to continuous emissions to the environment, especially when RMMs are not applicable. The DS would agree to grant a longer transitional period for the remaining uses of PFOA and PFOA-related substances in the professional sector. Personal protection equipements needs to fulfull specific requirements, which are established in respective standards (e.g. standard EN 13034 for protective clothing against liquid chemicals – performance requirements for protective clothing offering limited protective performance against liquid chemicals; standard EN 469 for protective clothing for firefighters – performance requirements for protective clothing for firefighting). However, for textiles used outdoor, e.g. (awnings and outdoor furnishing, camping gear, covers for outdoor and marine equipment, exterior architectural textiles, and geotextile) alternatives are available. Moreover, those items may directly emit residual amounts of PFOA and PFOA-related substances into the environment a derogation for these uses is not proportionate. For personal protection equipment a derogation until 2020 would be feasible to allow further development of alternatives.

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The 2004 gear tested by Professor Peaslee ignited more response in the science community in addition to Robert Bilott's efforts. The scientists were reaching out to each other seeking ways to secure funding for testing new gear and outreach began to secure dust studies in stations that would volunteer.

While we await the actual PFAS testing results of this same 2004 gear., we continue to receive questions daily from the first responder community. They want to know where they can find the information on their labels. I tell them it is not on your labels. There is no chemical content on your labels. This must change. We cannot go forward with the knowledge that there are chemical additives in our gear and not disclose them to the end user.

In November, NIOSH published its Framework for Personal Protective Equipment Conformity that it has been working on for some time.

https://www.cdc.gov/niosh/docs/2018-102/default.html

IOSH Publications & ProductsNIOSH-Issued Publications

National Framework for Personal Protective Equipment Conformity Assessment - Infrastructure

The goal of our efforts at the National Institute for Occupational Safety and Health (NIOSH) is to provide national and world leadership to prevent workplace illnesses and injuries. We accomplish this by conducting and supporting activities to protect workers from work-related exposures to hazards. One core objective of this approach involves the development and use of personal protective equipment (PPE).

Workers are more likely to appropriately use PPE when they are confident that the equipment will provide the intended protections based on its conformance with appropriate standards. The National Academies of Sciences, Engineering, and Medicine (the Academies) indicates that "for the consumer or worker, conformity assessment provides confidence in the claims made about the product by the manufacturer and may assist the consumer with purchasing decisions in determining the fitness of a product for it its intended use." [IOM, 2011, page 3] A comprehensive and tailor-made conformity assessment (CA) program is the most effective way to manage risks of a non-conforming PPE and instill this confidence in PPE users. National Framework for Personal Protective Equipment Conformity Assessment – Infrastructure[PDF – 1,116 KB]

Most recently, IN NEW Hampshire it was revealed that water testing of fire stations was showing elevated levels of PFAS. NH Dist 1 State Representative Mindi Messmer, also an environmental scientist, has been proactive in bringing awareness to not only her New Hampshire community on this matter, but to the national fire services as well reaching out with information and writing legislative bills in her state regarding the PFAS contamination.

Our fire stations have used AFFF since 1983. Training with it and responding to incidents. What is in the water systems of these fire stations? Shouldn't' we be proactive to verify if PFOA/PFOS are elevated in all of our fire stations in America?

New Hampshire: On October 2nd, 2017, PFOA was elevated in 6 of 7 fire stations tested. (See New Hampshire DES LETTER TO FIRE STATIONS, New Hampshire Fire Station Test Results, and Class B Firefighting Foam Investigation, attached.) This is particularly concerning in that our firefighters shower, cook with, and drink the water at their stations.

http://mediad.publicbroadcasting.net/p/nhpr/files/firestation_results_des_12-4-17.pdf

SUMMARY OF POLY- AND PERFLUORINATED COMPOUNDS IN GROUNDWATER AT SELECT FIRE STATIONS IN NH (nanograms/liter - parts-per-trillion (ppt)) 12/4/2017

https://www4.des.state.nh.us/nh-pfas-investigation/wp-content/uploads/2017/11/Fire_Department_H20Sample.pdf

October 2, 2017

Subject: Recommended Sampling of Drinking Water Wells at Fire Stations for PFAS Compounds
Dear Fire Departments:

The New Hampshire Department of Environmental Services (NHDES) is recommending fire departments that obtain drinking water from an on-site water supply well, voluntarily test their water for poly and perfluoroalkyl substances (PFAS) to ensure the drinking water used at these facilities is safe for fire department personnel and others that use these facilities.

Elevated levels of PFAS have been detected in drinking water obtained from water supply wells at six out of seven fire departments sampled to date. The discovery of contamination in drinking water wells at fire stations has prompted

additional sampling off-site and the detection of elevated PFAS concentrations in nearby private and public drinking water supply wells

If the recommended sampling is completed, please provide the results to NHDES so the data can be incorporated into the state's PFAS database. If the testing results show that the water is contaminated with combined concentration of perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) above 70 nanograms per liter (ng/L) or parts-pertrillion, then this information must be reported to NHDES within 60 days and a site investigation and implementation of corrective action measures may be required. NHDES has adopted an Ambient Groundwater Quality Standard of 70 ng/L for the combined concentration of PFOA and PFOS. NHDES requests that the information be reported immediately, opposed to within sixty days as allowed by rule, so that the assessment of potential impacts to other nearby drinking water wells can be expedited,

A list of laboratories that can complete the testing and analytical guidelines is attached and can be found at https://www.des.nh.gov/organization/commissioner/documents/pfoa-testinglabs.pdf. Please request that the laboratory provide you sampling instructions. Typical sampling requirements include washing hands, wearing nitrile gloves, not wearing water/weatherproof or stain resistant clothing, and wearing natural fiber (such as cotton) well laundered clothing to avoid contaminating the samples during the collection process.

Please report sample results and direct any questions regarding this letter to: Brandon Kernen New Hampshire Department of Environmental Services PO Box 95 Concord, New Hampshire 03302 Brandon.Kernen@des.nh.gov | phone 271-0660 | fax 271-0656 Additional recommendations on private well water quality testing for other contaminants can be found at https://www.des.nh.gov/organization/divisions/water/dwgb/well_testing/index.htm. Lastly, as a follow-up to previous fire departments/PFAS/Class B initiatives, online forms to: 1) Report past and recent uses of Class B Foam; and 2) Provide information/interest on a potential state-wide initiative to dispose of older Class B foam that contains PFOS can be found online at https://www4.des.state.nh.us/nh-pfas-investigation/?page_id=148.

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CLOSING STATEMENT

The PFAS/PFOA/PFOS issue in the fire service has many layers and encompasses many organizations, health issues, manufacturers, legal, toxic, etc., we are seeking an independent and specific task force on this issue; PFAS/FIRST RESPONDERS.

Therefore, for all of the above listed reasons and issues, studies and omissions, we request your immediate attention to form a task force to review, investigate, and act upon on behalf of this nations' firefighters/first responders exposure to PFAS/PFOA/PFOS.

The following items should be given priority in a task force specific to the fire fighter turnout gear and foam.

This outline for your review shows the areas of concern that we have encountered and identified.

NFPA part 2

* Labels in gear. There are chemical additives in PPE. The end user must know what they are, how much is in the PPE, what the long term effects are, and in the case of precursors that form PFOA, how long is the gear good for?

* NFPA – Each manufacturer should be required to submit a statement indicating if they are under legal or restricted use of any chemical in our PPE and or equipment in this land or any other land. In the case of PFOA, in 2006 the manufacturers were notified of this issue. This issue could have come up for discussion 12 years ago.

* NFPA – Manufacturers must notify NFPA immediately if they are made aware of any component now or newly added to the SVHC or CEC designation.

* NFPA - Enact a provisional standard to develop safe handling methods for current PPE. To ensure awareness of the yet to be proven safety of 'new generation' PFAS used in water repellent coatings and moisture barrier backings. Turnout gear is universal, using the same chemical additives throughout the international community that are labeled a SVHC, banned and restricted in the European Union.

NPFA provisions standard is a seldom used method to fast track a standard into use.

* What consequences will there be for the manufactures who knew of these toxins but omitted it from NFPA Liaisons, committees, and IAFF leaders.

IAFF

* Resolution 34. PFOA contains all the same issues that Resolution 34 was enacted for. Please enforce Resolution 34 and give PFOA/PFOS and PFASs the same attention that was given FRs, and Diesel Exhaust

* Has IAFF grown dependent on the income provided from manufacturers from various sources, advertising, etc? .

* Has IAFF been deceived by the manufacturers it trusteed to protect us.

*** Does IAFF provide transparency for monies received by manufacturers?**

*** Contact. Any attempts I have made to contact and speak with IAFF Executive leader Harold Schaitberger, to share findings have been handled poorly. Phone messages, emails, packets of letters and documents have gone completely unacknowledged.**

Thankfully, that was not the case on the local level as our PFFM President Rich MacKinnon, Local 1009 president Michael Papagni and executive members, and Local 1314 Fall River President Jason Burns were not only open to conversation but where acting to seek answers along side Paul and I. As well as IAFF District VP Ricky Walsh along with firefighter and lobbyist Michael White with the Washington State Council of Fire Fighters just this past month introduced House Bill 2793.

It is the first in the Nation and is very specific in its language:

http://lawfilesext.leg.wa.gov/biennium/2017-18/Pdf/Bills/House%20Bills/2793.pdf

AN ACT Relating to reducing the use of certain toxic chemicals in 2 firefighting activities; adding a new chapter to Title 70 RCW; and prescribing penalties.3 4 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON: 5 NEW SECTION. Sec. 1. The definitions in this section apply 6 throughout this chapter unless the context clearly requires 7 otherwise. 8 (1) "Class B firefighting foam" means foams designed for flammable liquid fires.9 10 (2) "Department" means the department of ecology. 11 (3) "Firefighting personal protective equipment" means any 12 clothing designed, intended, or marketed to be worn by firefighting 13 personnel in the performance of their duties, designed with the 14 intent for the use in fire and rescue activities, including jackets, 15 pants, shoes, gloves, helmets, and respiratory equipment.

*** Update, on January 17, 2018 Paul and I participated in a very productive conference call with IAFFs Patrick Mprrison; H&S Director, Matt Vinci; Education Director, Rich MacKinnon; PFFM President, Michael Papagni; Local 1009 President and IAFF Information Officer. The invitation for the 90 minute conference came at the request of PFFM President Rich MacKinnon for which we are extremely grateful. See call highlights here:**
https://www.facebook.com/permalink.php?story_fbid=1984667295190677&id=1808869939437081

January 16, Conference Call with IAFF Discussion Highlights:

**Thank you again Rich MacKinnon,
President PFFM who initiated the call last week with an invitation to speak with IAFF. Paul and I wish to thank Rich for the opportunity to open the dialogue with IAFF publicly on this topic.**

**Pat Morrison, IAFF Assistant General President for Health, Safety and Medicine.
Matt Vinci, IAFF Director of Education
Rich MacKinnon, President PFFM
Mike Pagagni President L1009 and IAFF IO,
Paul and myself. Were on the call.**

Our conversation ran approximately 90 minutes and we discussed the following:

Pat discussed the gravity of the issue within the fire service when the Station Pride article first hit and how it affected them in IAFF headquarters. He went on to discuss some of the actions they have performed since that time which include researching and outreach to manufacturers.

We discussed the European Unions findings and their regulations of 25ppb PFOA and 1ppm PRECURSORS for the year 2020.

We discussed Dr Roger Klein and his power-point presentation in the 2016 European Unions PPE Symposium.

We discussed the new 'C6 technology and precursors that will form PFOA'.

We discussed Dr Philippe Grandjean of Harvard School of Medicine and his explanation of the 'new technology'.

We stressed the need to inform the IAFF body of their actions as the silence is confusing and concerning. Pat stated he would be working on that.

I explained that every day my phone pings all day from chiefs, firefighters, local presidents, and health & safety officers, asking for the information regarding what is being taught in Europe.

We discussed the many forms of FF cancer and the studies done, the toxins, and briefly how we did things years ago.

Matt spoke about the similarities of this issue and the flame retardants, the work they have done to make legislation happen in that area and the work IAFF continues to perform on the state and federal levels in all areas of FF Cancer.

Mike spoke about what is being done on a state level regarding toxins and legislation.

We spoke about studies and research ongoing regarding firefighter cancer.

We spoke about the manufacturers method of minimizing this issue and pushing it back on 'products of combustion'. Also discussed were many toxins encountered in the profession, asbestos, flame retardants, plastics, hydrogen cyanide.

At that point Paul was very clear and said , "you understand we are not talking about products of combustion. We are talking about a toxin that was impregnated in our gear while they knew and we didn't".

We spoke about hard work and efforts the IAFF body has performed on presumptive laws for firefighter cancers.

We reviewed the many findings I have regarding what the manufacturers knew and when they knew it, DuPont's sin of omission while sitting on our NFPA, their complacency while preaching FF cancer to us while knowing they were under litigation for this toxin and telling their shareholders their bottom line will be adversely effected if restrictions on PFOA are implemented among other findings.

We discussed the need for teaching best practices of handling your current PPE as an immediate concern.

We discussed conflicts of interest. Manufacturers big money and how it works in lobbying and its reach within the fire service.

We discussed concerns over past amounts of PFOA used and our push for dust studies in your stations.

We discussed AFFF's toxicity, and past practices while we were not fully aware how dangerous it was, now realizing the manufacturers did know the danger.

We discussed Robert Bilott.

That he is fighting out front to bring studies and testing. We spoke about his 195 page letter to Environmental Protection Agency (EPA), Centers for Disease Control (CDC), Agency for Toxic Substance and Disease Registry (ATSDR).
That Robert Bilott is the authority on every aspect of this issue.

Pat said he will reach out to Rob Bilott. Nothing could of made us happier than to hear that.

We spoke about PFOA regulations, and how difficult and how long it takes to get the wheels of change moving in the EPA and legislation.

We discussed my outspokenness about IAFF. That the many calls, emails, messages and letters that went unresponded to were problematic to me.

We discussed labels. Warning labels. and FEMSA.

We discussed this issue becoming a topic for 2019 cancer symposium.

We discussed the science community and how concerned they are regarding this issue.

We discussed the findings of Professor Peaslee.

We discussed Susan Shaw and her work on flame retardants.

We discussed Courtney Carignan and her availability to us on a moments notice.

We discussed Jeff Burgess and his work.

We discussed thee many research papers done and Pat was aware and concerned of the high serum numbers of perfluorinated chemicals (PFCs) in firefighters.

We discussed Mindi Messmer in NH and her assistance to us on this issue.

We discussed Congressman McGovern and his wanting to act on this issue.

I advised after many months of research and seeing many conflicts of interest, omissions and multi layers of knowledge of how dangerous these toxins were and are, that the issue prompted my request to ask for task force request to investigate the issue covering AFFF and PPE to the fire service.

We feel confident IAFF is now acting on this issue.

Top of Form

Bottom of Form

*** Symposiums and teaching. We should be leading and not following what is being taught:** https://www.firerescueforum.com/content

Training, see also:

http://hemmingfire.com/news/fullstory.php/aid/2660/PPE___Duty_of_Care_Forum_-_condensed.html

excerpt:

PPE & Duty of Care Forum - condensed

Published: 23 February, 2016

Dr Roger Klein of Cambridge (UK) and Christian Regenhard Center for Emergency Response Studies, John Jay College of Criminal Justice, CUNY, New York provided an insightful presentation on the history and latest developments regarding PPE and fluorochemicals in the fire service.

Modern emergency services' PPE makes extensive use of fluorotelomer-treated fabrics for protection against both polar, i.e., water and alcohols, and non-polar, i.e., hydrocarbons, oils and greases, contaminants. The commonly used fluorotelomer acrylate and methacrylate polymers have been characterised traditionally by predominantly C8, C10, and C12 chain lengths, in order to get the required performance and durability of finish.

However, increasing concern by regulatory authorities over the environmental and human health impact of releasing PFOA – and longer chain perfluorocarboxylic acids (PFCAs) –to the environment based on unacceptable PBT

(persistent, bio-accumulative, toxic) profiling has led first to the voluntary PFOA Stewardship Program 2010/2015 by the US Environment Protection Agency and, more recently, to the European Chemical Agency (ECHA) PFOA Restriction Proposal initiated by the German and Norwegian governments.

The ECHA PFOA Restriction Proposal sets out to limit free PFOA to 25 parts per billion and PFOA precursors to 1,000ppb (or 1ppm) in all manufactured articles. This is a modification to the original overly strict limit of 2ppb for both free PFOA and PFOA precursors which followed an industry-wide consultation.

In order to give industry time to develop alternative technologies, however, there are specific time-limited derogations for firefighting foam of 1ppm for both PFOA and PFOA precursors, and for protective clothing used by the emergency services, police and military.

The situation is particularly acute for all-weather clothing and hazardous materials PPE since these applications have relied on using fluorotelomer polymers especially rich in C8, C10 and C12 fluorotelomer chains. All C8 fluorotelomer derivatives are known to breakdown to PFOA in the environment. By analogy, C10 and C12 fluorotelomers will yield perfluoro-n-decanoic acid and perfluorododecanoic acid, both of which are more toxic and bioaccumulative than PFOA. All PFCAs are highly environmentally persistent.

Since the introduction of the PFOA Stewardship Program industry has switched to fluorotelomer derivatives using so-called pure C6 compounds. Unfortunately even the very best of these are still contaminated with significant levels of C8 derivatives (and possibly C10, C12…) in terms of achieving the very low levels of PFOA precursors required by the ECHA Restriction Proposal, although free PFOA levels have been drastically reduced. Moreover, switching to pure C6 fluorotelomer derivatives has highlighted problems of achieving functional efficiency, especially in terms of the required levels of oil and water repellency, durability, and maintenance costs.

The PPE industry is thus left with the pressing problem of developing an alternative to fluorochemical treatment that retains functionality and durability.

CONFLICT OF INTEREST

*** Manufacturers misused the trust of fire services, IAFF, NFPA, and the front line by supplying much needed funding to our cancer research, that led to a false sense of security regarding our AFFF and PPE.**

*** Was the fire service aware of PFOA? PFOS? If so when? What precautions did the fire services take if in fact they were made aware?**

*** How to address the omission of the manufacturers for so long.**

*** How does the fire service stand guard that this does not happen again?**

*** Fire service has always assumed the toxins we absorb are from incidents. How does this revelation of the toxic chemical additives in our gear affect the cancer research over the last twenty years. Is there a way to determine the exposure we have had in a back calculated method?**

*** Lobbyist ACC. American Chemical Council. One of the VP's of DuPont sit on this council. This group lobbies against the changes that are taking place in Europe regarding our PPE.**

https://www.in-pharmatechnologist.com/Article/2006/12/18/EU-chemical-law-passed-amid-controversy?utm_source=copyright&utm_medium=OnSite&utm_campaign=copyright

***What options are there to determine how much a role PFOA , PFOS and precursors have harmed our Firefighters? Is 'backcalculation' an option here?**

***The many kidney/testicular/prostate/liver cancers in young firefighters, who can look at that to see if there is a correlation to PFOA precursors?**

***What restitution will the manufacturers make to the firefighters that bought their gear with the knowledge it was impregnated with toxins? They were not given the choice. Over a 25 year career a FF will have 5 sets of gear at approximately 2000.xx each.**

***What restitution will manufacturers make to the fire service for studies it participated in, benefited from, and received government monies from, while omitting the knowledge of PFOA content in our PPE and allowing firefighters to use AFFF without their knowledge of how toxic the chemicals were, while they informed their shareholders of concerns and knew from 3M of same concerns.**

And this., from a post I made in July 2017, after reading of a firefighter battling cancer, the hypocrisy of these findings stood out to me, I call it 'The Circle'... :

Your Turnout Gear and PFOA shared your post.
Published by Diane Cotter · July 12, 2017 ·
I urge all IAFF members to notify your representation to advise them of the facts below :

Last week, I learned of a FF from Great Falls MT who has cancer, who had hoped for the passage of legislation in his state for health coverage. SB-72
From the article, at least one insurance group was there to lobby
against it:
At least one insurance group, the National Association of Mutual Insurance Companies, lobbied against the presumptive coverage bill during the session, according to files with the Commissioner of Political Practices

Nationwide Mutual Insurance is part of this NAMIC. IAFF uses Nationwide Insurance for its deferred comp plan:

These are the 2015 IAFF QUARTERLY REPORT FOR IAFF-FC DEFERRED COMPENSATION PLAN
https://nationwidefinancial.com/media/pdf/NRX-0255AO-IF.pdf

and Nationwide owns 20M worth of DuPont shares. IAFF uses Nationwide for its retirement plan. May 28, 2017:
https://baseballnewssource.com/.../nationwide.../724819.html
Nationwide Fund Advisors raised its stake in shares of E I Du Pont De Nemours And Co (NYSE:DD) by 3.4% during the first quarter, according to its most recent disclosure with the SEC. The firm owned 307,860 shares of the basic materials company's stock after buying an additional 10,086 shares during the period. Nationwide Fund Advisors' holdings in E I Du Pont De Nemours And were worth $24,730,000 as of its most recent filing with the SEC

http://www.greatfallstribune.com/.../firefighters-.../343143001/
Political firefight: Firefighters still battling for lung-disease coverage
****

I don't know what anyone else thinks.. but I know I don't like this one bit. I know nothing of investments.. but someone please tell me this is not ok.... is this ok? I mean seriously, am I crazy? Does anyone else have a problem with this?

FF CANCER REGISTRY. NO WAY SHOULD ANY MANUFACTURER BE INVOLVED IN THIS. If that is even a consideration. JUST MAKING SURE.

OTHER AVAILABLE PRODUCTS

It was brought to our attention, that in the 1980s, another product was brought to the attention of the NFPA Committee on Structural Firefighting PPE. The produce was a natural fiber; wool. It was made in Sweden. It was stated that the fiber performed extremely well under water resistance testing. It was stated that DuPont and others protested the fabric/fiber moving forward to FEMA's 'SAFER' or Staffing for Adequate Fire & Emergency Response Grants.

https://www.fema.gov/staffing-adequate-fire-emergency-response-grants

***This brings up a concern while reading the ECHA 'response to comments' that was posed to the chemical manufacturers. They stated only one item could meet the testing of EN 749 (similar to NFPA 1971), that was C8., that making C6 is more costly.**

While reading the MANY reports on the performance of turnout gear that was new, or used, over various time periods, the 'water resistance' testing showed 'new' turnout gear met 100% of the time the minimum standards set by NFPA 1971 liquid penetration.

Is the water testing standard too high? Only one product meets the standard. Only one manufacturer makes the product.

This should be examined. Only one manufacturer makes the fabric that meets this standard, and other fabrics (wool) were not allowed to be tested. PPE in the USA alone is a 6 billion dollar a year business.

This test was performed on 'moisture barriers' not the 'outer shell'.

See page 55:
https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1004&context=mat_etds

When evaluating the type of water penetration failure (seam or fabric or both) 48.6% of failures were due to both fabric area and seam areas combined. For the remaining failures, 44.6% were due to seam failures only and **just 6.8% were due to fabric failures only**. Figure 4.11 below illustrates these results.

See page 53:

Figure 4.9. Hydrostatic Test Results; n=91 The results of the hydrostatic test showed 57 out of 73 (78.08%) liner systems that failed the water penetration barrier evaluation were between 10 and 12 years from manufacture date. Six garments (31.58%) that failed were between the ages of 13 and 21 years from manufacture date.

A higher percentage of moisture barriers between ages 10 and 12 years failed versus the moisture barriers between ages 13 and 21 years. One garment whose age could not be determined failed the hydrostatic testing. All garments were evaluated according to NFPA 1971, in the same locations according to garment type (pant or coat). According to NFPA 1971, additional locations that may have potential damage should be evaluated by the fire department, but were not done for the purposes of this study. The high rate of moisture barrier failures (between 10 and 12 years) indicates 54 the current wear life of no more than 10 years is supported by the water penetration barrier evaluation. Figure 4.10 shows the hydrostatic testing results by garment age.

LEGISLATION

* At the very least. This must be a opportunity for change. We must have the same legislation and restrictions on PFOA/PFOS that the ECHA has set the groundwork for, or better.

* Labeling in our gear. This must be mandatory. Not decided by FEMSA or NFPA. If there are chemical additives in our gear, that we are going to sweat and absorb in our skin, over our entire bodies, over the length of a 20 plus year career, we must know the chemical content and the long term effects and short term effects of our bodies absorbing toxins.

For many years we have believed we have started with a clean slate when we don our PPE. And that the toxins we are subjected to are from incidents we respond to. That is not the case.

Labels must provide chemical content.

* Does the US government grant chemical companies money for studies and testing? Should they receive monies while they withheld this information from America's bravest?

* Can the manufacturers pay for dust studies in our stations and serum testing for those firefighters / responders that want it?

* How did manufacturers omission of PFOA/PFOS effect the insurance and health care sector, if in fact we were made aware in 1999 that PFOA was used in our gear and in 1983 that AFFF contained these toxins?

* First responders must be protected against the chemical giants. This past 18 months of revelations of omissions and studies showing great health risks, of reports of what the chemical giants did know., it appears to me at least, that the manufacturers took advantage of the fact that firefighters are exposed to so many products of combustion during fires and overhauls, and chemicals during hazmat incidents, that it was easy to omit the carcinogens PFOA/PFOS from the organizations that oversee the fire services.

*Washington State Council of Fire Fighters have introduced 2 bills that are expected to pass both sides of the house. HB 2793 and SB 6413. These bills are the blueprint for a National footprint. http://lawfilesext.leg.wa.gov/biennium/2017-18/Pdf/Bills/Senate%20Bills/6413-S.pdf and http://lawfilesext.leg.wa.gov/biennium/2017-18/Pdf/Bills/House%20Bills/2793.pdf#page=1

ENVIRONMENTAL ATTORNEY ROBERT BILOTT

*** I ask full support of the offer of Attorney Robert Bilott to stand with us and help with studies and testing for our first responders and firefighters.** ***On a personal note, over 2 years of searching and 5 environmental attorney's each researching this for months at a time only to choose to pass on this., Robert Bilott was the only Environmental Attorney willing to take this on.***

*** I ask the fire, science, and political leaders support Robert Bilott's efforts to secure testing and studies specific to firefighters for PFAS, working with CDC/ATSDR and EPA.**

*** Robert Bilott has been at the helm of this issue since he first placed the words PFOA and PFOS in the nation's vocabulary by discovering the toxin at the Tennant's farm. If there is anyone on this planet that can assist with writing legislation for the restriction of these chemicals it would be him.**

CHIEF JEFFREY HERMES

*** Were it not for the bravery of Chief Jeffrey Hermes, who shared so much with me, this may not have gotten the attention of Robert Bilott. Thank you Jeff and Janet.**

Dr PAUL A. BROOKS

*** Dr Paul A Brooks. Is an original member of the C8 Science Panel. His company, Brookmar Inc , was responsible for testing and organizing the testing of 70,000 clients.**

Dr Brooks has lent his assistance to this issue and has the blueprint ready for us.

" A highly trusted physician in the Parkersburg area, ***Dr. Brooks and his company, Brookmar Inc., were responsible for the largest environmental health enrollment survey in U.S. history***, involving 69,000 participants. Data they collected was the primary basis for finding potential links to human disease among people exposed to a chemical known as perfluorooctanoic acid (also known as PFOA or C8). A number of influential research papers using this data set have appeared in leading journals."

SCIENCE COMMUNITY

I have had the wonderful opportunity to speak with and email with many scientists. I was literally shocked at how quick and fast they were to respond, and to include me in emails

when they were discussing how to reach out and find funding for research, or to offer names of others they thought could be of help.

Special thank you to Professor Graham Peaslee, Courtney Carignan, Susan Shaw, Jeff Burgess, Mindi Messmer, Alberto Caban-Martinez, Phillippe Grandjean, Barbara Alexander, Myrto Petreas, and most recently, Commander Kenny Fent, Holly Davies.,

Thank you all so much for all of your efforts.

FIRE SERVICE, Researchers, and Media

Over the past year there has been so much support from individuals within the fire service, chiefs, local leaders, firefighters, and spouses of firefighters, fire cancer research personnel, environmental advocates, and the political arena who I've emailed, spoken to, messaged, and or met with. If I have forgotten a name or organization please forgive the oversight., I trust you know who you are and wish to thank you for all of your support, guidance, and prayers. .

Special thanks, Jason Burns, Jeremy Henthorn, Rich MacKinnon, Mike Papagni, Pat Morrison, Matt Vinci, Jack Sexton, Cindy Ell, David Gallagher, Bobby Halton, Frank Ricci, Ryan Riley, Billy Goldfeder, Ric Jorge, Paul Enhelder Vicki Quint, Ross Dalton, Russell Scott, Keith Wilder, Eric Lamar, Sharon Lerner, Jeff Hirsch, Jordan Levy, Mariah Blake, Callie Lyons, Michael Hickey, Loreen Hackett, Scott McKay, Page McCarthy, Mark Cady, Robert Cotter, Jeff K. , Kev Hartigan, Gina GG Lauder, Steve Greene, Worcester Fire Department, Local 1009… a call, a message, a push, did not go unnoticed.

Also, the Fire Fighter Cancer Foundation Inc, Firefighter Cancer Support Network, Florida Firefighters Safety and Health Collaborative, San Francisco Firefighters Cancer Prevention Foundation, Last Call Foundation, Leary Firefighters Foundation, and Washington State Council of Fire Fighters, Toxic Free Future, Toxic Actions Center, Boston Fire Department to name only a few of the dedicated organizations whose efforts to teach, document, share knowledge and research firefighter cancer cannot be understated.

STATION PRIDE

Editor Jon Marr took a chance on this issue. It was uncharted territory, but he allowed me the opportunity to share an article I had written. That first article had thousands of shares and over 75,000 reads in the fire service.

We are forever grateful Jon Marr and Ron Givens.

Congressman James McGovern,

A true friend of the fire service. A true environmental leader.

Erin Brockovich

Two years ago, after reaching out to EB while seeking to find answers to firefighter cancer clusters., we became engaged in multiple conversations. It was her asking 'is there PFOA in the gear?' that ignited this research.

FIREFIGHTER FAMILES,

We are but one family in a sea of tens of thousands of firefighters who have heard the words 'it's cancer'.. there is no way to tell you all how we feel your pain and heartache. Please know you are in our thoughts and prayers daily in this life-changing event.

My husband Paul

I am heartbroken at how much he has lost. He was a fireman's' fireman. He misses his job every single day. He lived for that truck and life at the station, we as a family miss his daily interactions with the public and his brothers and sisters. We are so grateful he is alive and we are able to begin a new chapter in our lives. I am not saying PFOA was a cause of his cancer. We will never know. I am saying, if someone told either of us he'd be wearing gear with PFOA in it for 27 years while his body absorbed the toxins in permeating his gear, we would never have allowed it.

I sincerely hope you will find that this issue needs the combined efforts of multiple agencies and experts.

Sincerely

Diane Cotter

Fireman's wife.

IMPORTANT UPDATE - JANUARY 29, 2018

PFAS TEST RESULTS RECEIVED FROM PROFESSOR PEASLEE , SAMPLES FROM

'2004 NEW, NEVER-WORN, STRUCTURAL TURNOUT GEAR' :

-----Original Message-----
From: Graham Peaslee
To: d >
Sent: Mon, Jan 29, 2018 5:29 pm
Subject: Re: PFAS testing on turnout gear

Hi Diane,

I have some LC-MS/MS results from an academic lab that I trust...they took the four pieces of clothing you sent me and took a small piece of each and rinsed it three times in heated methanol, and analyzed the rinse for the presence of 78 different PFAS. We know from previous textile work that this only will get some small fraction of what is adhered to the fabrics, but it will identify what is there. The results look something like this:

	Concentration (ng/g)							
Item	PFBA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFTeDA	FHUEA
Right Sleeve	**<LOQ**	**14**	**<LOQ**	<LOD	**121**	**66**	<LOD	<LOD
Left Under Arm	**<LOQ**	<LOD	**13**	**116**	**74**	**57**	<LOD	<LOD
Moisture barrier	**<LOQ**	<LOD	<LOD	**41**	<LOD	**25**	<LOD	<LOD
Tail	**<LOQ**	<LOD	**14**	<LOD	**84**	**28**	**30**	<LOD
Envelope	**46**	**109**	<LOD	<LOD	<LOD	<LOD	<LOD	**40**

A quick explanation...these are the 7 diffferent PFAS that showed up above level of detection (LOD), or above level of quantification (LOQ). The PFBA are C4 acids, the PFHxA are C6 acids, the PFHpA are C7 acids, the PFOA are C8 acids, the PFNA are C9 acids, and the PFDA are C10 acids, and the last one is a C11 acid.

The first four rows are your four fabric samples with concentrations in ppb, and the last sample is the brown envelope in which the samples were shipped, so it is possible it contained some short-chained PFAS that might have contaminated the right sleeve sample. If you want to send these to a commercial lab at some point, you will want to put them in individual ziploc bags.

In summary, there are C8, C9 and C10 PFAS found on each garment, but less on the moisture barrier. These are "long-chain" PFAS, and the majority seems to be heavier than PFOA, although there is certainly PFOA present. Combined with the PIGE results which showed high levels of F present, and a methanol rinse that only removes a small fraction for analysis I would guess there is plenty of these long-chain PFAS applied to these garment samples.

The lab also did a GC/MS test for volatile PFAS, and found only volatile PFAS on the Tail sample, but with fairly high concentrations: 6:2 FTOH (120 ng/g), 8:2 FTOH (3600 ng/g), and 10:2 FTOH (1300 ng/g) (with all other analytes below detection.)

The fact that both the GC and LC/MS data are indicating C8 and C10 in the samples helps confirm the long-chain observation. To my knowledge, this type of long-chain PFAS chemistry is not typically used in textiles these days...so it is unusual to see them in samples.

I trust these data, and you are can share these results with your colleagues - but if you want to go further with the data in a court of law or elsewhere, you would have to have a commercial lab confirm these results...and that is pricey I know, but now you know what to look for at least. Armed with this information I bet you can start asking who used these long-chain PFAS commercially in fire-resistant clothing.

I wish you luck in your investigation. Sorry this took so long, but all the labs are very busy these days.

GRAHAM

****

The results show the PFOA was there, in what amounts we do not know.. but if the testing extracts a 'fraction' of the potential amount, and this fraction of 116 ppb is 5 times the ECHA limit set in 2015 of 25ppb (the chemical industry wanted to derogate PPE altogether, ECHA fought back with a 2ppb limit and finally reached a compromise with chemical giants at 25 ppm), then what amounts are we actually talking about here... how much was really in our gear.... Is 5 times the ECHA limit of 25 ppb ok?

There were no laws, no legislation, ACC saw to that.. they broke no laws...

CONGRESS, SENATE, FIX THAT. PLEASE. FOR THE LOVE OF GOD. ECHA has done the

Work for us. We must have those regulations here. You can see how the corporate creep into the fire service has harmed us.

February 2, 2018

Additional Closing Statement.

We demand a complete and thorough investigation in the matter of PFAS in the fire service by US Attorney General Jeff Sessions.

In light of the 2004 gear testing results received on Jan 29th, 2018 it is apparent we have been being poisoned for years. We have outlined our case for what DuPont knew and when they knew it. All the while being immersed in every aspect of not only the fire service, and NFPA, but also all of our fire fighter cancer research, symposiums, teaching, seminars and what else I do not know.

If after reviewing this document, and no action is taken on behalf of America's bravest, to mandate federal legislation of PFASs and institute watchdog polices to protect us from the this fantastic and diabolical display of corporate greed, we have lost the battle to all those who wish to take advantage of us, the working front line, for the support of corporate shareholder reports.

Sincerely,

Diane Cotter

Fireman's wife

2.18.2018 NEW FINDINGS:

The attached SEC filing from DuPont to shareholders shows that in 2005, they were upset that the United Steelworkers Union notified 40,000 companies that their were issues and concerns over the health and welfare of the USW employees at the plants pertaining to the use of chemicals. In the case of PFOA., USW notified one of our manufacturers of our turnout gear, that company is W.L. Gore. Gore never said a word to the fire service. But, they do fund our IAFF cancer symposiums. See USW's 28 page document here:

http://assets.usw.org/resources/hse/resources/Walking-the-Talk-Duponts-Untold-Safety-Failures.pdf

Did Gore tell the IAFF in 2005 there was a issue with PFOA????

Did Gore not tell the IAFF in 2005 there was a issue with PFOA???

Who else received a letter from USW union?

Who else was silent?

WE WERE POISIONED. THE MANUFACTURES KNEW. DO SOMETHING.

WHO KNEW WHAT AND WHEN DID THEY KNOW IT..... That is now the question we want answered.

See highlighted area below.

https://www.sec.gov/Archives/edgar/data/30554/000135740607000016/dsfvreport1.txt

<DOCUMENT>
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<TEXT>

U.S. SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

NOTICE OF EXEMPT SOLICITATION

1. Name of the Registrant:
E.I. DU PONT DE NEMOURS & CO.

2. Name of person relying on exemption:
DUPONT SHAREHOLDERS FOR FAIR VALUE

3. Address of person relying on exemption:
P.O. Box 231, Amherst, Mass. 01004

(PHOTOGRAPH OF A STOCK CHART)

THE SHAREHOLDER'S RIGHT TO KNOW MORE

2007 Update

Dupont's Market and Liability Exposures Continue from PFOA and Related Issues

Sanford Lewis, Strategic Counsel on Corporate Accountability
for DuPont Shareholders for Fair Value

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(DUPONT SHAREHOLDERS FOR FAIR VALUE LOGO)

Dear Shareholder,

The enclosed report updates DuPont investors on important issues of disclosure and potential financial impact on share value. As you may know, perfluorooctanoic acid (PFOA) is the controversial chemical intermediate involved in the production of numerous DuPont products, including stain and grease resistant coatings for consumer products such as carpets, textiles and food packaging.

Following our 2005 correspondence with the Securities and Exchange Commission regarding DuPont's reporting to shareholders, Securities and Exchange Commission accountants wrote to DuPont with guidance for conducting better disclosure on these matters. Despite this guidance, in our opinion, the company is still withholding disclosure of information relevant to the financial risks associated with PFOA. For example:
- While the company has announced that it intends to end the production and use of PFOA by 2015, it has not provided shareholders with an assessment of the losses the company may suffer in the marketplace by continuing to use PFOA in the meantime. As shown in our report, numerous companies and competitors are shifting to PFOA free alternatives and may not stand by for the company's long timetable for elimination of PFOA in its products.

- The company has failed to disclose that some experts believe that its fluorotelomer products, which it intends to continue to produce even after ending the use of PFOA, may break down to PFOA in use or in the environment. Independent scientific assessment is already underway to assess this.

- The company did not report to shareholders on the preliminary findings released February 2007 from Johns Hopkins University researchers in which newborn babies who had been exposed to low levels of PFOA in utero had decreased birth weight and head circumference - emblematic of developmental impacts.

- The company failed to note that more restrictive thresholds related to drinking water limits on PFOA have been recommended by regulators in Minnesota and New Jersey, and that Minnesota is now intent on handling PFOA contaminated sites as Superfund sites.

DuPont Shareholders for Fair Value (DSFV), the issuer of this report, is an informal group of DuPont shareholders organized by the United Steelworkers (USW) and concerned with proper disclosure and accountability on the issues relative to PFOA. DSFV includes Amalgamated Bank, United Steelworkers, and Green Century Capital Management.

We hope that after you read the report you will join with us in pressing DuPont management for more expeditious action to eliminate the production of PFOA and products that can break down to PFOA, and for more complete disclosure on these matters.

Sincerely,

/s/
Sanford Lewis
DuPont Shareholders for Fair Value

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UPDATE REPORT
DUPONT MARKET AND LIABILITY EXPOSURES
CONTINUE FROM PFOA AND RELATED ISSUES

DuPont Shareholders for Fair Value

April 2007

SYNOPSIS

PFOA (perfluorooctanoic acid) is a chemical used to help make fluoropolymers and fluoroelastomers. E. I. du Pont de Nemours & Co. (DuPont) is the only US producer of PFOA. Fluoropolymers are used in architectural fabrics; chemical processing piping and vessels; automotive fuel systems; telecommunications and electronic wiring insulation; and computer chip processing equipment and systems, and consumer products such as cookware and apparel. PFOA is used as a processing aid in the manufacture of fluoropolymers for use in non-stick surfaces such as Teflon coated cookware. Fluoroelastomers are synthetic, rubber-like

materials used in gaskets, O-rings and hoses.

This report is an update of prior reports: THE SHAREHOLDER'S RIGHT TO KNOW MORE: E.I. DU PONT DE NEMOURS AND THE GROWING FINANCIAL CHALLENGES OF PFOA (April 2005) and THE SHAREHOLDER'S RIGHT TO KNOW MORE: DESPITE DUPONT'S RECENT CONCESSIONS TO EPA, SHAREHOLDER VALUE REMAINS AT RISK FROM PFOA (2006). The prior reports are available on the internet at www.DupontShareholdersAlert.org.

<TABLE>
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DUPONT'S DEFERRED ELIMINATION OF PFOA MAY CONTINUE TO JEOPARDIZE DUPONT PRODUCT LINES AS CONSUMER AND INDUSTRIAL CUSTOMERS OPT FOR PFOA-FREE PRODUCTS BEING OFFERED BY DUPONT COMPETITORS CURRENTLY AND IN THE INTERVENING YEARS.
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DUPONT PRODUCT REFORMULATION RESPONSES. A shareholder proposal voted upon at the 2006 Annual General Meeting called on DuPont to prepare and publish a plan for expeditiously ending the use and production of PFOA and materials capable of breaking down to PFOA. The resolution received 29% support of shareholders. Nearly a year later, in February 2007, the company announced in that it is continuing to reduce the trace content of PFOA in products, and that it now intends to eliminate the use and production of PFOA by 2015. However, it has no plans to eliminate the production of fluorotelomers, despite the expectation of some experts that over the long term these products may break down to component alcohols, and then to PFOA in use or in the environment. Further independent studies are underway to assess the ability of fluorotelomer products to break down to PFOA. Fluorotelomer products, which include stain and grease repellant coatings,
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constitute a substantial portion of the company's fluoride-based business activities. An eight year timeline for elimination of PFOA in products may also, as noted in this report, continue to jeopardize DuPont product lines as consumer and industrial customers opt for PFOA-free products being offered by DuPont competitors currently and in the intervening years.

Assessment of Securities and Exchange Commission Disclosures

Some members of DuPont Shareholders for Fair Value have filed letters of complaint with the Securities and Exchange Commission requesting an investigation of DuPont management's failure to disclose information material to investors regarding PFOA. The correspondence with the SEC requested an evaluation of whether the company should have disclosed to investors, or should now be ordered to disclose, information including the following:

<TABLE>
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AFTER WE WROTE TO THE SEC, SEC ACCOUNTANTS TOLD DUPONT TO

DISCLOSE MORE INFO ON THE RISKS ASSOCIATED WITH PFOA, INCLUDING EMERGING SCIENCE AND REGULATORY TRENDS. BUT IN OUR VIEW, THE COMPANY'S REPORTING HAS SCARCELY CHANGED IN RESPONSE.
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</TABLE>

- Liability indicators such as environmental contamination and blood tests associated with all DuPont facilities where PFOA is used or produced;
- A more balanced description of the scientific evidence arrayed against PFOA, which suggests that it is likely to be harmful to human health despite the company's reiterated denials of such effects;
- Regulatory and market trends, including regulatory developments in Canada, Europe and Australia, and consumer and retail developments that may restrict markets for DuPont products.

Subsequent to the shareholder letters, accountants at the Securities and Exchange Commission wrote to DuPont with a series of inquiries on how it discloses liabilities, expenses and science regarding PFOA. The correspondence resulted in disclosure to the SEC of $11 million in legal fees, research and communications costs associated with PFOA during 2005, not limited to the Parkersburg area issues. The company also acknowledged that it viewed it as "reasonably possible" that DuPont could incur additional liabilities at other facilities relative to PFOA releases, but said that it was unable to quantify such liabilities.

After those disclosures SEC wrote to the company April 21, 2006, after review of the 2005 10-K (issued February 2006) with specific instructions and remarks regarding the company's duty to disclose in future reports, such as this year's 10-K:

> In your most recent response you state that it is reasonably possible that you will incur losses related to exposure to PFOA from sources other than Washington Works, but because you are not aware of any particular source that may cause such loss, a range of loss, if any, cannot be reasonably estimated at this time. However, because losses are reasonably possible we urge you to carefully

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> consider the following areas when you determine the probability of loss, estimates of amounts, and other disclosures related to risks and uncertainties. In future filings, where appropriate, should address the following in better detail:
>
> - current and probable findings from the EPA, the Science Advisory Board, the independent science panel and their evaluation in West Virginia;
>
> - current and probable findings by any other government, agency, or scientific study, either foreign or domestic;
>
> - provide more detail concerning any findings you become aware of concerning the possible health impact of PFOA;

- emerging trends, by both institutions and consumers, concerning the safety of PFOA and any related products; and

- the amounts and underlying assumptions of any accruals and reasonably possible ranges of loss.

It should be noted that the DuPont 10-K report for 2006, issued a year after the SEC's correspondence providing guidance for future disclosure, still failed to disclose many of the key developments:

<TABLE>
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DUPONT HAS NOT INFORMED SHAREHOLDERS OF THE IMPORTANT THOUGH PRELIMINARY FINDINGS OF JOHNS HOPKINS UNIVERSITY IN WHICH NEWBORN HUMAN BABIES EXPOSED TO LOW LEVELS OF PFOA HAD DECREASED BIRTH WEIGHT AND HEAD CIRCUMFERENCE - EMBLEMATIC OF DEVELOPMENTAL IMPACTS.
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</TABLE>

"Current and probable findings." It failed to disclose the highly notable preliminary findings of Johns Hopkins University regarding potential developmental toxicity impacts on humans. In early 2007 Johns Hopkins University researchers revealed a study of which found that that newborn human babies that had been exposed to low levels of PFOA had decreased birth weight and head circumference. While the research is considered preliminary, it could represent a dramatic new piece of evidence of actual developmental effects in humans.

It also failed to disclose that the second phase of the company's study of Washington Works employees, completed in October 2006, found a possible correlation between PFOA exposure and coronary heart disease mortality, a "statistically non-significant increase in kidney cancer mortality and a statistically significant increase in diabetes mortality" when the workers examined were compared to employee peers. The company has said to researchers that "These associations did not appear to be related to PFOA exposure, but there were too few cases to make definitive conclusions." (Note that in prior laboratory studies, PFOA was found to affect test animals' kidneys.) The 10-K report only reported on this mortality study that "No overall increase in deaths related to heart disease was found." The company also has not disclosed the development of more stringent water standards or recommendations that may be costly to the company, in Minnesota and New Jersey, as described below. These stringent new standards are particularly notable in that their health based rationales may
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yet be applied by other states, wherever DuPont or its customers are emitting PFOA or PFOS.

The company did not disclose the extent to which customers and markets are demanding, and shifting to, PFOA-free products at

present. As detailed in this report, numerous companies and sectors are committing to PFOA free products, and there is no certainty that the company's elimination of PFOA over the next decade will be fast enough to preserve its customer base.

Finally and perhaps most significantly, the current decision to eliminate the use and production of PFOA does not include the elimination of fluorotelomers, and we believe the company has not given sufficient disclosure of the fact that assessment is underway in the scientific community, outside of DuPont, to assess whether fluorotelomers will break down to constituent telomer alcohols and then to PFOA in use or in the environment.

HEALTH HAZARDS. In February 2006, the EPA's scientific advisory board, a panel of independent experts convened by the EPA, announced its determination that PFOA should be declared a "likely human carcinogen." Numerous new studies during the year documented the prevalence of PFOA in the human environment, and in bodily tissues. This included a Johns Hopkins study showing the presence of PFOA in infants' umbilical cord blood, in 298 of 300 babies tested.

REGULATORY ACTION. Based on the latest scientific information, Minnesota Department of Health has lowered its Health Based Values (HBVs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). The new HBVs are 0.5 parts per billion (ppb) for PFOA and 0.3 ppb for PFOS. The guidelines previously used were 1 ppb and 0.6 ppb respectively. A Health Based Value is the concentration of a groundwater contaminant, or a mixture of contaminants, that poses little or no risk to health, even if consumed daily over a lifetime. Minnesota officials have also stated their intention to declare that PFOS and PFOA are hazardous substances so that sites are subject to cleanup under the state Superfund law. Officials in the state of New Jersey recommended a level of .04 ppb for PFOA, even lower than the Minnesota value.

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MINNESOTA ADOPTED TIGHTER CRITERIA FOR PFOA IN DRINKING WATER AND INTENDS TO REQUIRE SUPERFUND CLEANUPS. NEW JERSEY OFFICIALS PROPOSED EVEN TIGHTER CRITERIA.
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New European Union legislation (REACH) requires companies to register and test nearly every chemical produced and used. Companies may have to phase out or find alternatives for chemicals considered highly dangerous to humans and animals.

On March 7, 2006, the USEPA published a Federal Register notice asserting that it can no longer presume that long chain polymers similar to PFOA 'will not present an unreasonable risk to human health or the environment.' The agency proposed withdrawing a longstanding exemption to pre-manufacture notice under the Toxic Substance Control Act for those seeking to manufacture or import new substances of this kind.

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CONSUMER LIABILITY. Potential liability related to consumer and environmental exposures to PFOA at DuPont and other companies continues. The $5 billion consumer lawsuit over alleged hazards of Teflon continued to proceed during the last year. In May 2006, a judicial panel ruled that lawyers in 13 national cases involving 16 lawyers representing more than 73 clients should meet. DuPont's attorney maintained that Teflon could not be proven toxic in court because "not one study has shown that there is any harm to consumers," but the plaintiffs assert that the actionable harm involved was the lack of disclosure of risk information known to the company, rather than a claim for physical injury.

ENVIRONMENTAL LIABILITY. Contamination of water and soil with PFOA was disclosed or alleged at several additional DuPont sites during the past year. PFOA discharges into the James River from the DuPont Spruance plant in Richmond, Virginia were found. A class action lawsuit was filed in Deepwater, NJ over PFOA-contaminated water in the Delaware River from the Chambers Works plant. The suit seeks medical monitoring for residents, a community-wide water filtration system and punitive damages. PFOA was found in drinking water samples, and in streams, near DuPont's Parlin, NJ plant. PFOA was found in monitoring wells at DuPont's plant in Fayetteville, NC, in the blood of DuPont workers and in a drinking well one mile from the plant site. Residents of Pascagoula, MS opposed a permit for DuPont to dispose of PFOA in public waters at its First Chemical facility after PFOA contamination of groundwater under the plant was found in the company's own investigation.

The company reported incurring additional unanticipated costs of over $20 million relative to implementing the settlement of litigation at its Washington Works facility in Parkersburg West Virginia, including costs of water treatment and supplies and studying of potential health impacts. This is on top of previously reported settlement costs of $107 million.

MARKETPLACE CHANGES. DuPont competitors and suppliers continue to migrate from PFOA-containing products. During the year, food company ConAgra and carpet company Mohawk joined with other companies such as Wal-Mart and McDonalds in searching for alternatives to products that contain PFOA. The search for alternatives is driving DuPont's competitors, who are bringing PFOA-free products to market. In September 2006, 3M announced it would relaunch its Scotchgard fabric protector without PFOA or PFOS chemistry./1/

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<S>
DUPONT IS STILL UNDER CRIMINAL INVESTIGATION BY THE DEPARTMENT OF JUSTICE FOR FAILURE TO DISCLOSE INFO ON PFOA TO THE EPA.
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CRIMINAL AND SEC INVESTIGATIONS. DuPont reported in its latest

10K report that criminal investigation of the company for failure to disclose alleged hazards of PFOA are still underway by the US Justice Department. In addition, inquiries by the US Securities and Exchange Commission led to disclosures by the company that it incurred $11 million in legal fees, research and communications costs associated with PFOA during 2005, not limited to the Parkersburg area. It also acknowledged that it
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viewed it as "reasonably possible" that the company could incur additional liabilities at other facilities relative to PFOA releases, but said that it was unable to quantify such liabilities.

Despite the recent progress, shareholder value remains at risk. To date, DuPont has failed to detail any actual impacts on shareholder value or company earnings resulting from consumers concerns, reputational damage or market fluctuations related to PFOA. This document describes threats to shareholder value that may have imminent impact.

BACKGROUND ON DSFV

DuPont Shareholders for Fair Value (DSFV), the publisher of this report, is an informal group of DuPont shareholders organized by the United Steelworkers (USW) and concerned with proper disclosure and accountability on the issues relative to PFOA. USW is a DuPont shareholder, and also represents approximately 1,800 DuPont employees in New York, New Jersey, Delaware and Kentucky. DSFV includes Amalgamated Bank, United Steelworkers, and Green Century Capital Management. Collectively this group holds over 411,000 shares of DuPont stock.

Some members of DuPont Shareholders for Fair Value have filed complaints with the Securities and Exchange Commission regarding the failure of DuPont management to disclose information historically and recently known to the company regarding the financial, health and environmental risks associated with PFOA. Disclosure of such information may have better informed shareholders regarding the extent to which the management's adherence to PFOA chemistry has harmed shareholder value. Some members of DSFV have also filed shareholder resolutions for annual meetings in 2005 and 2006 related to disclosure of issues related to PFOA.

AUTHOR BACKGROUND

Sanford Lewis, the author of this report, is an attorney and expert on corporate environmental disclosure issues, including requirements for disclosure under the securities laws. The author wishes to acknowledge the assistance of Kate Casa, Efan Hsieh and Nathaniel Johnson in the preparation of this document.
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BACKGROUND ON DUPONT & PFOA

PFOA (perfluorooctanoic acid) is a surfactant, a water-soluble

chemical that can emulsify oils or liquids in water, suspend small particles in water or act as a wetting agent. APFO (sometimes referred to as C-8) is the ammonium salt of PFOA and the chemical form used in fluoropolymer manufacturing. In this document, we will refer to PFOA generally to include interchangeably the salts (APFO and C-8) as well as its other formulations. E. I. du Pont de Nemours & Co. (DuPont) is the only current U.S. producer of PFOA.

PFOA is used to help make fluoropolymers and fluoroelastomers. Fluoropolymers are used in architectural fabrics; chemical processing piping and vessels; automotive fuel systems; telecommunications and electronic wiring insulation; and computer chip processing equipment and systems, and consumer products such as cookware and apparel./2/ PFOA is used as a processing aid in the manufacture of fluoropolymers for use in non-stick surfaces such as Teflon coated cookware. Fluoroelastomers are synthetic, rubber-like materials used in gaskets, O-rings and hoses.

Animal and human studies have found a likely association of PFOA with a wide array of health harms, ranging from elevated cholesterol, to liver damage, birth defects, and cancer. As a result of these studies, most involving animal testing, PFOA has come under increasing scrutiny in regulatory, consumer and judicial forums.

VOLUNTARY CAPPING OF PFOA IN PRODUCTS

In 2005, DuPont management announced a commitment to reduce the presence of PFOA in certain products. DuPont announced that it had developed a new technology to reduce the presence of PFOA in aqueous fluoropolymers applications, thereby reducing the emissions of PFOA that could occur at processors by 90%. However, this reduction in direct emissions of PFOA still left the company vulnerable due to the continued presence of PFOA in DuPont products. In addition, even though a product may contain no PFOA, available evidence suggests that various DuPont products may break down into PFOA in the environment or in the human body.

On January 25, 2006, EPA invited DuPont and several other companies to participate in the "2010/15 PFOA Stewardship Program" involving a voluntary commitment to goals set by EPA. The EPA program sets interim goals for 2010 of 95% reduction of PFOA emissions and PFOA precursors in product content. It also calls for companies to commit to working toward the elimination of PFOA, PFOA precursors, and related higher homologue chemicals from emissions and products by five years thereafter, or no later than 2015.

In order to commit to the program, companies were required to submit a letter describing their commitment. The DuPont letter talked about reducing PFOA emissions and residual product content over the next decade. In the letter, the company did not commit to eliminate the use and production of PFOA and its precursors by 2015. Instead, the company discussed emissions reduction measures and caps on the amount of PFOA and its precursors in company products.

In February 2007, DuPont said ongoing manufacturing modifications have resulted in a 94 percent reduction in PFOA emissions as of year-end 2006. The company projected it
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would achieve reductions of 97 percent by the end of 2007. The company also stated that it was on track to eliminate the use and production of PFOA by 2015. However, this reduction in direct emissions of PFOA still left the company vulnerable the risk of loss of customers due to the continued presence of PFOA in DuPont products. In addition, even though a product may contain no PFOA, available evidence suggests that various DuPont products may break down into PFOA in the environment or in the human body.

This paper will review DuPont's vulnerability under this timeline - the formidable impacts of market and regulatory trends, and of potential liability associated with the use or emission of PFOA.

CIVIL SETTLEMENT

On December 14, 2005, DuPont signed a $16.5 million settlement of a civil case by the EPA. The civil case alleged DuPont's failure to disclose information to the EPA regarding potential risks of perfluorooctanoic acid (PFOA) to health and the environment. Under the terms of the settlement, DuPont admitted to no legal liability

The agreement reached between DuPont and the EPA resulted from multiple allegations of violations of section 8(e) of the Toxic Substances Control Act (TSCA), which states that:

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THE EPA HAS STATED THAT IT CAN NO LONGER PRESUME THAT SUBSTANCES RELATED TO PFOA ARE SAFE UNDER THE TOXIC SUBSTANCES CONTROL ACT.
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"Any person who manufactures (includes imports), processes or distributes in commerce a chemical substance or mixture and who obtains information which reasonably supports the conclusion that such substance or mixture presents a substantial risk of injury to health or the environment shall immediately inform the (EPA) Administrator of such information unless such person has actual knowledge that the (EPA) Administrator has been adequately informed of such information."

EPA alleged that among other things, the following information was not reported by DuPont as required by law:

- In 1981, the 3M Company, DuPont's supplier of PFOA, advised DuPont about the potential for PFOA to cause birth defects in rats. Specifically, 3M advised DuPont that researchers observed what appeared to be treatment related damage to the eye lenses of some rat pups.

- In 1981, the company observed PFOA in blood samples taken

from pregnant workers at the Washington Works facility, in West Virginia where Teflon is manufactured, and at least one woman had transferred the chemical to her fetus.

- DuPont detected the chemical in public water supplies as early as the mid-1980s in West Virginia and Ohio communities in the vicinity of the Washington Works facility. By 1991, DuPont had information that the chemical was in water supplies at a greater level than the company's exposure guidelines indicated would cause no effect to members of the community.

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- In 2004, DuPont had data concerning human serum sampling of twelve members of the general population living near the Washington Works facility after it had obtained this information from its contractor, Exygen. The study shows that on average, Teflon chemical serum levels in this group - all of whom had consumed tap water contaminated with the Teflon chemical from DuPont's Washington Works operations and only one of whom had ever worked at the facility - were 12 times higher than levels measured previously from the general population (67 ppb versus 5 ppb)./3/

Although DuPont denied that it had a duty to disclose this information, it settled the claims for $16.5 million, the largest civil administrative penalty settlement the EPA has obtained to date. The amount included a $10.25 million penalty and a commitment by DuPont to spend an additional $6.25 million on environmental projects./4/

ONGOING CRIMINAL INVESTIGATION RELATED TO DISCLOSURE

The EPA civil settlement may not resolve all claims against DuPont regarding its concealment of information on this matter. DuPont is also the subject of a PFOA-related Department of Justice grand jury probe. In May 2005, DuPont was served with a grand jury subpoena from the U.S. District Court for the District of Columbia. The subpoena ordered DuPont to release documents related to PFOA, its salts, C8, ammonium perfluorooctanoate, and FC-143. This investigation is apparently still ongoing as this paper goes to press, and could ultimately result in separate criminal charges being brought against DuPont or its officers. THE COMPANY HAS REPORTED IN ITS CURRENT ANNUAL REPORT THAT EMPLOYEES ARE STILL IN THE PROCESS OF RESPONDING TO SUBPOENAS FROM THE DEPARTMENT OF JUSTICE ON THIS MATTER.

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<S>
SEC STAFF WROTE TO DUPONT FOLLOWING UP ON OUR CORRESPONDENCE WITH THE SEC. THEY PROPOSED CRITERIA FOR BETTER DISCLOSURE FOR THIS YEAR'S 10-K. HOWEVER IN OUR OPINION, THE COMPANY'S DISCLOSURES ARE LARGELY UNCHANGED.
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SECURITIES AND EXCHANGE COMMISSION INVESTIGATION

In addition, some members of DuPont Shareholders for Fair Value have filed letters of complaint with the Securities and Exchange Commission requesting an investigation of DuPont management's failure to disclose information material to investors regarding PFOA. The correspondence with the SEC requested an evaluation of whether the company should have disclosed to investors, or should now be ordered to disclose, information including the following:

- Liability indicators such as environmental contamination and blood tests associated with all DuPont facilities where PFOA is used or produced;

- A more balanced description of the scientific evidence arrayed against PFOA, which suggests that it is likely to be harmful to human health despite the company's reiterated denials of such effects;

- Regulatory and market trends, including regulatory developments in Canada, Europe and Australia, and consumer and retail developments that may restrict markets for DuPont products.
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Subsequent to the shareholder letters, accountants at the Securities and Exchange Commission wrote to DuPont with a series of inquiries on how it discloses liabilities, expenses and science regarding PFOA. The correspondence resulted in disclosure to the SEC of $11 million in legal fees, research and communications costs associated with PFOA during 2005, not limited to the Parkersburg area issues. The company also acknowledged that it viewed it as "reasonably possible" that DuPont could incur additional liabilities at other facilities relative to PFOA releases, but said that it was unable to quantify such liabilities.

The SEC also wrote to the company April 21, 2006, after review of the 2005 10-K (issued February 2006). This letter included specific instructions and remarks to the company:

> It is your belief that it is remote that you will incur additional losses related to the West Virginia Class Action. You, as management, are in the best position to make this determination. We are not in a position to assess the safety of PFOA, however in the past your company has had contingent liabilities related to products that, although you believed they were safe, they nevertheless resulted in substantial material losses related to litigation, administrative costs and settlements. Please note that a statement that a contingency is not expected to be material does not satisfy the requirements of SFAS 5 if there is at least a reasonable possibility that a loss exceeding amounts already recognized may have been incurred and the amount of that additional loss would be material to a decision to buy or sell your securities. We also note that the $63 million you recorded in the 3rd quarter of 2004 was a substantial amount relative to the pre-tax income of $225 million.

In your most recent response you state that it is reasonably possible that you will incur losses related to exposure to PFOA from sources other than Washington Works, but because you are not aware of any particular source that may cause such loss, a range of loss, if any, cannot be reasonably estimated at this time. However, because losses are reasonably possible we urge you to carefully consider the following areas when you determine the probability of loss, estimates of amounts, and other disclosures related to risks and uncertainties. In future filings, where appropriate, should address the following in better detail:

- current and probable findings from the EPA, the Science Advisory Board, the independent science panel and their evaluation in West Virginia;

- current and probable findings by any other government, agency, or scientific study, either foreign or domestic;

- provide more detail concerning any findings you become aware of concerning the possible health impact of PFOA;

- emerging trends, by both institutions and consumers, concerning the safety of PFOA and any related products; and
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- the amounts and underlying assumptions of any accruals and reasonably possible ranges of loss.

It should be noted that the DuPont 10-K report for 2006, issued a year after the SEC's correspondence providing guidance for future disclosure, still failed to disclose many of the key developments of the subsequent year as detailed in this report. For instance, it failed to disclose the highly notable preliminary findings of Johns Hopkins University regarding potential developmental toxicity impacts on humans. It failed to disclose that the second phase of the company's study of Washington Works employees, completed in October 2006, found a possible correlation between PFOA exposure and coronary heart disease mortality, a "statistically non-significant increase in kidney cancer mortality and a statistically significant increase in diabetes mortality" when the workers examined were compared to employee peers. The company has said to researchers that "These associations did not appear to be related to PFOA exposure, but there were too few cases to make definitive conclusions." The company also has not disclosed the development of more stringent water standards recommendations that may be costly to the company, in Minnesota and New Jersey, as described above.

PREVALENCE AND HAZARDS OF PFOA.

HEALTH HAZARDS TO HUMANS. Evidence of health harm in humans from PFOA began to mount during the year. A study of newborn human babies conducted by Johns Hopkins University found that babies exposed to low levels of PFOA had decreased birth weight and head circumference. While the research is considered preliminary by the Johns Hopkins University researchers, if confirmed, it could

represent a dramatic new piece of evidence - actual developmental effects in humans - about the potential dangers of C8 and similar chemicals. Dr. Lynn Goldman, formerly the director of the USEPA toxicology lab, headed the study and presented the preliminary findings at a workshop of the Society of Toxicology in February 2007. Prior disclosed research (February 2006) found PFOA present in umbilical cord blood samples from 298 of 300 babies tested.

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<S>
PFOA WAS FOUND PRESENT IN UMBILICAL CORD BLOOD SAMPLES FROM 298 OF 300 BABIES TESTED.
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In addition, information in an on-going study leaked from the West Virginia Bureau of Public Health indicates that residents of communities polluted with PFOA have higher levels of several cancers, including prostate cancer and non Hodgkin's lymphoma. This study does not conclude that the chemical caused these illnesses, only that there are more cases in areas where the chemical PFOA is present. The state says more research is needed to determine if other factors could be the cause./5/

On February 16, 2006, the EPA's scientific advisory board, a panel of independent experts convened by the EPA, announced the board's determination that PFOA be declared a "likely human carcinogen." The advisory board's determination that PFOA is a "likely human carcinogen" went beyond EPA's prior assessment that PFOA should be listed as a "suggested human carcinogen."/6/
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Despite these recent findings, as well as a groundswell of animal evidence supporting the existence of human health hazards, the company continues to maintain the following position: "Based on health and toxicological studies conducted by DuPont and other researchers, DuPont believes the weight of evidence indicates that PFOA does not pose a health risk to the general public."

NEW STUDIES IN ANIMALS. A Swedish study in mice found that early-life exposure to PFOS and PFOA can rewire the brain in ways that dramatically affect behavior./7/

In a study published in the January 2006 issue of Toxicological Sciences, scientists at Japan's National Institute of Animal Health found that PFOA exposure in lab rats altered the way the liver transports and metabolizes lipids, especially fatty acids. The researchers are starting to look at how PFOA affects the kidneys, and they have expanded their research to chickens.

PREVALENCE OF HUMAN EXPOSURES. A number of recent scientific studies have expanded current understanding regarding the widespread prevalence of PFOA exposures in humans.

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NEW TESTS OF HOUSEHOLD DUST AND HUMAN TISSUE CONTINUED TO SHOW ELEVATED LEVELS OF PFOA AND PFOS.
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In June 2006, a study of lab tests of mothers and their daughters showed that industrial chemicals including PFOA can be passed down across generations, according to a report from the Environmental Working Group. Chemicals that persist in the body were found at higher levels in mothers than daughters, showing how chemicals can build up in the body over a lifetime. Mothers had an average of 1.5 to 5.2 times more pollution than their daughters for lead, methyl mercury, brominated flame retardants, and PFOA and PFOS.

PFOA contaminates the blood of white Americans at three times the level of Mexican Americans and twice the level of African Americans, according to a study by the Centers of Disease Control and Prevention published in the April 2006 edition of Environmental Science and Technology. Women had lower concentrations than men, according to the study. White males averaged seven parts per billion of PFOA in their blood, while white women averaged four ppb. While no conclusive reason for the different concentrations is known, genetics and environmental factors may play a role, researchers said./8/

In 2005, Toxic-Free Legacy Coalition, an alliance of more than 50 health care and advocacy groups, collected blood, hair and urine samples from 10 prominent Washington state residents to see which toxic chemicals were getting into their bodies. The results, released in May 2006, showed that all 10 people tested positive for perfluorinated chemicals.

In a June 2006 Canadian study ("Polluted Children, Toxic Nation," released by Toronto watchdog group Environmental Defense), five Canadian families - six adults and seven
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children - were tested for 68 toxic chemicals. While the parents had greater exposures and higher concentrations of the chemicals, the children as a group were more polluted with several chemicals, including PFOA.

IMPACT ANALYSIS

CONCERN OVER PFOA IS ALREADY DRIVING CHANGE IN MARKETS

VULNERABLE DOMESTIC FOOD PACKAGING MARKET

Companies who use food packaging containing DuPont products with PFOA or PFOA precursors are facing pressure to eliminate these materials in their packaging.

In November 2005, a former DuPont chemical engineer named Glenn Evers made national news when he disclosed information and documents related to DuPont's Zonyl paper coating products. Evers appeared on ABC World News Tonight and in the Washington Post,

among other outlets, discussing how popcorn products, fast food, pizza boxes, and various other food packaging products expose consumers to fluorotelomers that are believed to break down to PFOA in the body. The whistle-blower also brought to light his knowledge that the company had been developing alternatives to PFOA decades ago, but that those have apparently not been widely deployed to substitute for PFOA.

In a January 30, 2006, Wall Street Journal article a representative of McDonald's corporation reported the company's intention to reduce its use of PFOA-related products./9/ On February 2, 2006, the Toronto Globe & Mail reported that McDonald's Canada said its packaging suppliers had begun a phase-out, and that McDonald's Canada will be using alternatives that are PFOA-free./10/

The pressure to curtail or outright eliminate PFOA content in food packaging and product lines is also being felt by major retailers such as Wal-Mart. Wal-Mart is the current subject of a campaign by the consumer-rights group, Ohio Citizen Action, which is urging its members to contact Wal-Mart to request the retailer: ". . . use its considerable clout to ensure that the first order of business in the phase-out is to remove these chemicals from food packaging, such as microwave popcorn, candy wrappers, and frozen foods."/11/ Matt Kistler, Wal-Mart's vice president for product development and private brands, told Ohio Citizen Action in spring 2006 that Wal-Mart is working with suppliers to eliminate PFOA in products and packaging. He said Wal-Mart's regular meetings with suppliers include discussions about Teflon chemicals and the suppliers' ability to switch to different materials. Kistler reported that Wal-Mart's suppliers have been responsive, and said Wal-Mart is learning that some suppliers can make this switch faster than others./12/ In addition to requesting action from Wal-Mart and food retailer Kroger and numerous local grocery retailers, consumers have addressed their concerns directly to DuPont as part of Ohio Citizen Action's campaign. As of February 15, 2006, a total of 15,090 people had sent handwritten letters and petitions to DuPont demanding the company take Teflon (PFOA)
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chemicals off the food packaging market. In addition, 13,437 people have sent handwritten letters and petitions to local grocery stores urging them not to carry products with the PFOA-related chemicals in the packaging/13/

A shareholder resolution filed at Mohawk, the large carpet company, by the United Methodist Church, led to a dialogue with the top management of the company, then a withdrawal of the shareholder resolution. The company's management expressed a clear commitment to avoid the use of PFOA in all carpet treatments as soon as possible - and had expressed a commitment to suppliers. Previously, in response to a shareholder resolution, ConAgra Foods agreed to prioritize efforts to replace fluorocarbon chemicals used in the packaging of its microwave popcorn products. ConAgra expected to complete its studies no later than May 2007.

NONSTICK COOKWARE

The potential health risks that may be associated with the use of Teflon non-stick cookware products continue to receive the bulk of PFOA-related scrutiny in the major media and lifestyle publications. In a growing number of cases, concerns over potential health risks associated with Teflon are finding a receptive audience in America's kitchens and altering consumer behaviors. Home cooks like Janeen Cunningham of Seal Beach, California have stopped using Teflon pans altogether and returned to using stainless steel cookware. Cunningham told Los Angeles Times reporter Jerry Hirsch that "I stopped using those pans because of what I have heard about Teflon and carcinogen properties over the past few months."/14/ Such actions are proving alarming to major cookware manufacturers. T-Fal, a New Jersey based subsidiary of French Cookware SEB, recently launched a line of uncoated pans as a diversification move." The concern is that there is a steady drip-drip about this and it will become part of the common knowledge about cookware even though people won't get PFOA from cookware," said Scott Meyer, President of T-Fal./15/ (Note, however, that some experts assert that trace residues of PFOA can escape from some Teflon cookware heated to between 600 and 752 degrees Fahrenheit. According to the Environmental Working Group, a Teflon pan can reach 600 degrees on high heat in two to five minutes.)

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THOUGH THE COMPANY DENIES THAT NONSTOCK PANS EMIT PFOA, THE CONTROVERSY CONTINUES TO STICK TO TEFLON.
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There have been hundreds of articles in the U.S. media covering DuPont and PFOA, with a number of those articles focusing on concerns related to Teflon coated cookware. In early February 2006, DuPont attempted to respond to domestic consumer concerns arising from PFOA-related publicity with full-page ads in The New York Times and other major papers./16/

PFOA ALTERNATIVES ENTERING MARKETPLACE

The search for product alternatives to replace PFOA is driving research and product development among DuPont's competitors, who are bringing PFOA-free products to the market. In September 2006, 3M announced it would relaunch its Scotchgard fabric protector without PFOA or PFOS. Mitch Culbreath, business development manager for 3M's Protective Materials & Consumer Health division, said "3M's reformulated
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Scotchgard Protector provides all the performance benefits consumers expect from the brand - stain resistance, stain repellency, and stain release - with products that are not based on PFOA or PFOS chemistry."/17/

Air Products has developed Airflex EF9100 emulsion as an

alternative to fluorochemicals used in grease-resistant packaging. Airflex EF9100 emulsion provides an environmentally friendly alternative and exhibits all the key performance measures of fluorochemicals, with the added benefits of being a water-based polymer emulsion. Likewise, Dynol 607 surfactant is an alternative for fluorosurfactants for high-performance coating applications. The surfactant is biodegradable, fluoro-free and may provide a more cost effective, non-persistent alternative to fluorosurfactant technology, HOME TEXTILES TODAY reported in September 2006.

In February 2006, Asahi Glass announced the introduction of AsahiGuard E-series, a line of telomer chemicals that serve as fluorinated water and oil repellents for textile and paper. Asahi Glass claims that these products are free of PFOA and PFOA precursors. The company has commenced production of AsahiGuard E-series products at a dedicated large scale manufacturing facility which at capacity will equal 1/4 of AsahiGuard's current manufacturing capacity./18/

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<S>
COMPETITORS CONTINUE TO BRING NON-PFOA ALTERNATIVES TO MARKET.
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Much of the research and development currently underway concerns the development of products which utilize short-chain fluorosurfactants instead of long-chain fluorosurfactants. Long-chain fluorosurfactants enter the body more readily, stick to blood proteins, and can break down to PFOA./19/ The 3M Company replaced a long-chain with a short-chain fluorosurfactant, known as C4 when it reformulated Scotchgard in June of 2003./20 According Dr. Scott Mabury of the University of Toronto, a leading expert in the study of the environmental effects of PFOA, the key to controlling the problem is to reduce: ". . . chain lengths to avoid bioaccumulation, and prudently select linkage chemistry for stable non-releasing materials."/21/

At least one company, Omnova Solutions of Fairlawn, Ohio has aggressively pursued product development of these more environmentally friendly short-chain fluorosurfactants, which it asserts can deliver comparable product performance in many applications. Omnova has obtained new chemical regulatory approval in the U.S. and Europe, and has achieved partial approval in Japan. The company is pursuing regulatory approval in China, Korea, and Australia./22/ Bill Beers, Global Chemical Regulatory Manager for Omnova, states that: Omnova Solutions has: ". . . tailored structures that meet both the demands of our customers for performance and the demands of the global regulatory authorities to assure that there are no environmental issues."/23/

Alternatives to PFOA are entering the market from numerous firms and researchers.

Omnova's Polyfox surfactants are now commercially available products utilized as alternatives to PFOA in a range of

applications such as varnishes and stains, automotive clear coats, electronic coatings, powder pigment dispersions, and adhesives./24/ In conjunction with partners, Omnova Solutions is pursuing stain-resistant treatments for textile, carpet, and paper industries, among others./25/
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Interest in developing non-stick cookware alternatives to non-stick cookware utilizing DuPont's Teflon brand has also been driving product development. Ferro Corporation, a world leader in the ceramic glaze coating business, has announced that it has developed RealEase(TM), a ceramic-based, nonstick coating. Ferro claims it has developed a non-stick surface that delivers the ease of cleaning commonly associated with Teflon-based nonstick cookware combined with the improved heat resistance and abrasion and scratch-resistance of enamel./26/

CONSUMER TEFLON PANIC IN CHINA

Consumer responsiveness to concerns over potential threats to health posed by the presence of PFOA in Teflon non-stick cookware is by no means limited to domestic markets. The international press has also shown a marked readiness to cover PFOA-related stories with hundreds of PFOA-related articles published internationally. Consumers in important international markets such as China have demonstrated intense concern over the potential presence of PFOA in Teflon non-stick cookware with important consequences for future growth and the DuPont brand's international reputation. Concern about Teflon-coated cookware caused widespread panic in China beginning in July of 2004. A December 9, 2004 report from the Financial Times global newswire reported that Chinese manufacturers of non-stick cookware suffered 90% drops in sales in August and September as Chinese consumers shunned Teflon in favor of iron woks and ceramic rice makers./27/ In the July-August 2004 period Chinese department stores reportedly began removing Teflon-coated cookware from their shelves and Guangdong-based Elecpro Electrical Appliance Co Ltd reportedly stopped selling its Teflon-coated rice cookers and was planning to seek $10 million in compensation./28/

A July 22, 2004 article in The Standard reported on the reactions of Chinese consumers and retailers during the period:

"After some news reports saying a substance in Teflon-coated pans potentially poses health risks, we started to remove the related non-stick frying pans from our shelves,'' an official at a ParknShop in Guangzhou's Tianhe District said.

Some individual homewares stores in Guangzhou's Tianhe and Wangfujing shopping centers also said they started to send Teflon-coated cookware back to warehouses as a temporary measure until the concern abates.

Although some large retail chains including Wanjie, Trust-Mart and Carrefour stores in Guangzhou still sell non-stick frying pans, their sales dropped more than 60 per cent in the past week, store employees said.

An official with one of the Wanjie stores in Guangzhou said sales of China-made brands of Teflon-coated cookware fell by more than 60 percent over the past week.

"Today, no one shows any interest in non-stick cookware," he said. This is because the worries that using Teflon-coated pans might increase the risks of cancer have not been dispersed." Safety concerns have also delayed China cookware makers' new-product promotions.

An official with Aishida, one of the largest cookware producers in China, said the company suspended the promotion of its new non-stick frying pans amid the increasing worries on non-stick cookware.
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But the official, who declined to be named, said the Teflon controversy did not seriously affect its non-stick cookware sales because 90 per cent of its production is exported./29/

While widespread concern may have subsided after the Chinese Academy of Inspection and Quarantine (CAIQ) declared that it found no PFOA in any of the non-stick cookware examined/30/ the listing of PFOA as a likely human carcinogen may fuel renewed concerns over the safety of non-stick cookware in China and in other parts of the world.

The awareness and sensitivity of Chinese consumers to risks associated with DuPont products may be counter to DuPont's interest in investing and growing in China. Further analysis is needed to assess the extent to which DuPont's reputation has been undermined with Chinese consumers, and how this may affect expansion of demand in that crucial growth market.

ADDITIONAL REGULATORY ACTION IS LIKELY IN U.S. AND ABROAD

DuPont disclosed in its November 2005 quarterly report filed with the U.S. Securities and Exchange Commission (SEC) that $1 billion in annual company revenues could be jeopardized by regulatory restraints on PFOA and fluorotelomers. The report marked the first time that DuPont had put a value on its PFOA and PFCA activities./31/

In its 10K report to shareholders, published February 23, 2007, DuPont notes:

> . . there can be no assurance that the EPA or any other regulatory entity will not in the future choose to regulate or prohibit the production or use of PFOA. Products currently manufactured by the company representing approximately $1 billion of 2006 revenues could be affected by any such regulation or prohibition.

Though the U.S. Environmental Protection Agency has so far set the voluntary ten-year "Stewardship" program as discussed above, neither the EPA nor other regulators may wait for more

expeditious, mandatory and restrictive action.

On March 7, 2006, the USEPA proposed one such restriction -- a new rule under the Toxics Substances Control Act which would require any person who intends to manufacture (or import) certain new long chain substances related to PFOA to file a premanufacture notice with the EPA./32/ EPA published a Federal Register notice stating that it can no longer presume that long chain polymers similar to PFOA will not present an unreasonable risk to health and environment.

Any such substance "not already on the TSCA Inventory would have to complete the TSCA premanufacture review process prior to commencing the manufacture or import of such polymers. EPA believes this proposed change to the current regulation is necessary because, based on recent information, EPA can no longer conclude that these polymers 'will not present an unreasonable risk to human health or the environment,' which is the determination necessary to support an exemption under TSCA. . ..." EPA notes that:

> Biological sampling recently revealed the presence of PFOS and PFOA in fish, birds, and mammals, including humans across the United States and in other countries. The widespread distribution
<PAGE>
> of the chemicals suggests that PFOS and PFOA may bioaccumulate. PFOS and PFOA have a high level of toxicity and have shown liver, developmental, and reproductive toxicity at very low dose levels in exposed laboratory animals. (Emphasis added)

If the rule takes effect, EPA would require each company making or importing the affected fluoropolymers to submit a premanufacture notice the same as any businesses do for new chemicals other than exempted polymers. EPA reviews exposure and toxicity information on each chemical and can ask companies for more data, can require protective equipment for workers, or can restrict the uses of the target substances.

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CURRENT REGULATORY DELIBERATIONS THREATEN TO TIGHTEN CONTROLS ON PFOA IN THE ENVIRONMENT IN MINNESOTA AND NEW JERSEY AND IN PRODUCTS SOLD IN CALIFORNIA.
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The Food and Drug Administration, state governments, and the governments of other countries may set more stringent and mandatory timelines for restriction or elimination of PFOA exposures or products.

STATE LEVEL REGULATORY ACTIVITIES

MINNESOTA. Based on the latest scientific information, the Minnesota Department of Health has lowered its Health Based

Values (HBVs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), two members of PFC group of chemicals that have been found at low levels in groundwater in southern Washington County. The new HBVs are 0.5 parts per billion (ppb) for PFOA and 0.3 ppb for PFOS. The guidelines previously used were 1 ppb and 0.6 ppb respectively.

A Health Based Value is the concentration of a groundwater contaminant, or a mixture of contaminants, that poses little or no risk to health, even if consumed daily over a lifetime. The updated HBVs for PFOA and PFOS take into consideration the potential for health impacts during fetal and other developmental life stages. A clearer understanding of how long these chemicals stay in the human body is also reflected in the revised HBVs.

NEW JERSEY. In 2007, New Jersey regulators, based on their assessment of the potential human health risk, recommended lowering the amount of PFOA allowable in drinking water to .04 ppb - substantially below the federal allowable limit of .5 ppb established for the Parkersburg, WV area.

MISSISSIPPI. The Mississippi House Conservation Committee held a hearing to consider legislation to place a moratorium on PFOA permits in the state, affecting DuPont's operations of First Chemical.

INTERNATIONAL REGULATORY ACTIVITIES

In June 2007, a tough new EU law called REACH (Registration, Evaluation and Authorization of Chemicals) is expected to take effect. Under the law, each manufacturer or company that uses chemicals in Europe will have to register nearly each chemical and test it for safety. Companies also may have to phase out or find alternatives for chemicals that are considered dangerous to humans and animals.
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DuPont, the world's third-largest chemical maker, has 37 manufacturing plants in Europe and a large network of suppliers. REACH is expected to have a significant effect

"Whether we support it or not, we are living with it," Linda Fisher, vice president and chief sustainability officer at DuPont in Washington, told the [Wilmington, Delaware] News Journal. "It's going to require a lot of work for the chemical companies, and it's going to require a lot of work for the European regulators." Fisher also has stated "It's going to be hard to explain to our markets and our public in the U.S. or in Asia why the Europeans don't think it's safe for them, but we're going to continue to expose you."

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VIEWING EVER TIGHTER CHEMICAL CONTROLS IN EUROPE, A DUPONT VP HAS STATED: "IT'S GOING TO BE HARD TO EXPLAIN TO OUR MARKETS AND OUR PUBLIC IN THE U.S. OR IN ASIA WHY THE EUROPEANS DON'T THINK IT'S SAFE FOR THEM, BUT WE'RE GOING TO CONTINUE TO EXPOSE YOU." (LINDA

FISHER, VICE PRESIDENT, DUPONT)
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Some consumer and environmental advocates see REACH as the beginning of a new era in global environmental regulations that will hold the industry accountable for the risks posed by its products. "The EU also sees itself as creating a new gold standard that others, including the United States, should emulate," the article stated.

In 2004, Canada's environmental protection agency temporarily banned three fluorotelomer chemicals used as stain repellents. This was the first time any government had banned such chemicals. PFOA and its relatives are now under increasing scrutiny by the environmental authorities in USA, UK, Norway, Sweden and Denmark. Further consideration of permanent regulatory restrictions is underway in Canada. In Norway, the Pollution Control Authority announced that in the course of 2006 it would obtain more information about the health and environmental effects of PFOA in order to evaluate regulation of its use. The agency will also ask the Norwegian Institute of Public Health and the Norwegian Institute for Water Research to provide an overview of the available information on the health and environmental effects of related compounds and use this information as a basis for evaluating whether it is necessary to introduce regulatory measures for other substances belonging to this group.

POLLUTION, LIABILITY AND PUBLIC PRESSURE TO END PFOA PRODUCTION
DUPONT'S NC PFOA PRODUCTION SITE
DuPont's Fayetteville Works production facility in Fayetteville, North Carolina is the only site in the U.S. where PFOA is produced. Despite the $7 million DuPont spent on environmental controls to contain PFOA when it opened the plant in 2002, on-site testing at DuPont's 2,200 acre property detected PFOA in more than 25 monitoring wells, as have tests of residential wells up to a mile from the facility. Samples taken from the nearby Cape Fear River have also been found to contain PFOA./33/
DuPont's testing of its workforce at the facility shows that the average concentrations of PFOA in blood samples
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rose from an average of 11 parts per billion per worker in 17 workers in 2002 to an average of 450 parts per billion in 37 workers in 2005.

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AT DUPONT'S FAYETTEVILLE WORKS PRODUCTION FACILITY IN NORTH CAROLINA WHERE PFOA IS PRODUCED, PFOA IS DETECTED IN MORE THAN 25 MONITORING WELLS, AND RESIDENTIAL WELLS UP TO A MILE FROM THE FACILITY.
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DENR's Regional Office in Fayetteville first learned of the C-8 contamination when the Plant manager was questioned about

groundwater contamination during a September 24, 2004 plant inspection by DENR. The DENR's Inspector noted in his report (page 4) that this information was "quite surprising." DENR did not receive written notification of PFOA contamination until mid-2006. DuPont's June 6, 2003 letter and "Notification of Newly Discovered Released Chemical" was addressed to NCDENR Division of Waste Management and identified the results of DuPont's January 27, 2003 sampling for C8 (PFOA). DuPont's letter did not mention that PFOA had also been found at trace levels in the plant's wastewater discharges to the James River. Although DuPont's January 13, 2004 Revised Phase I RCRA Facility Investigation Report to DENR stated on page 9 that annual sampling results for 2003 were "forwarded to DENR in a report dated March 2003," no such report could be located in DENR's files. DuPont later admitted to DENR's Division of Waste Management that the March 2003 Report, which reflected the results of samples taken in January 2003, had not been sent to DENR.

At the request of the local citizens' "C-8 Coalition," the DENR asked DuPont to expand its PFOA monitoring. On November 18, 2005 DuPont informed DENR that October groundwater monitoring next to its PFOA Plant had revealed PFOA contamination. Two of the four monitoring wells placed near the PFOA Plant showed levels up to 147 part per billion, much higher than levels found in other areas of DuPont's massive facility. The two remaining wells placed near the PFOA plant were not deep enough to reach groundwater. A total of 24 out of the 28 groundwater and surface water locations sampled in Sept/October of 2005 revealed PFOA contamination.

PFOA was found in wastewater discharges to the Cape Fear River, a drainage ditch leading toward the Caper Fear River, seepage from the ground on the plant, a private water well near the plant, and a private lake near the plant. Company reports identify PFOA air emissions and a air PFOA monitoring program. In April of 2006 DuPont refused to share air monitoring results with the NC C8 Coalition or the news media.

ADDITIONAL ENVIRONMENTAL LIABILITIES?

DuPont has already experienced over a hundred million in liabilities due to environmental releases of PFOA, and this may be just the start.

DuPont's Washington Works facility in West Virginia where Teflon is manufactured has been a source of extensive groundwater contamination from PFOA. Since at least 1984, DuPont was aware that PFOA was being discharged from its Washington Works facility. The company conducted, but at the time did not publicly disclose testing of drinking
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water supplies in communities near the facility. These tests revealed elevated levels of PFOA. Ground and drinking water contamination from the Washington Works facility resulted in a 2001 class-action lawsuit brought on behalf of 80,000 West

Virginia residents. A court approved settlement of this case in February of 2005./34/

The 2004 settlement of that West Virginia lawsuit required the company to spend at least $107 million to ensure that homes in the area are supplied with water uncontaminated with PFOA. The settlement includes PFOA water treatment facilities for six area water utilities, and initiation of a court-ordered C-8 Health Project, a five-year study correlating PFOA blood-serum levels in more than 60,000 area residents with the incidence of nine types of medical conditions, including cancer, heart disease and birth defects. As of January 2006, more than 43,000 people had signed up for the health study, with more than 17,000 having been tested since August. There was waiting list of about 26,000 people. In December 2006, the C8 panel asked thousands of study participants to participants in a follow-up study. The company reported in its 2006 10-K that additional expenses were incurred pursuant to the settlement - including water systems that cost $19 million ($9 million more than originally set aside) an additional $3 million for bottled water for another district until another water treatment plant is built; and added costs of studying health effects, for a total of $15 million ($10 million more than originally expected.)

A court-appointed panel of three prominent epidemiologists assigned to analyze and interpret the C-8 Health Project data requested permission in fall 2006 to study the effects of PFOA on nearly 5,000 Washington Works employees, many of whom have extremely high blood PFOA levels. DuPont is fighting to keep its employees out of the study.

In December 2006, the United Steelworkers harshly condemned DuPont for denying workers information on the harmful effects of PFOA and for refusing to hand over to the C-8 project data the company collected on employees West Virginia. The Steelworkers eventually received data through USEPA.

In November 2006, DuPont informed its employees in Deepwater, New Jersey, that levels of PFOA in their blood were as high as 6,330 parts per billion (ppb), thousands of times higher than the average level of 5 ppb in the general population.

On Nov. 20, 2006, the EPA forced DuPont to agree to pay for water treatment or an alternative water supply if the water supply of any household near Washington Works showed a PFOA concentration above 0.5 ppb.

In 2002, DuPont began producing a salt of PFOA at its Fayetteville Works plant in North Carolina after 3M, its former supplier, halted manufacture of the chemical in response to public pressure. Since 2003, small amounts of PFOA have been detected in groundwater and entering the Cape Fear River near the plant. In 2005, water in a well close to the plant showed an extremely high PFOA level of 765 parts per billion (ppb).

In April 2006, residents near DuPont's Chamber Works plant in Salem County, New Jersey sued DuPont, claiming the company had

known for years that the plant had
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contaminated their water supply with PFCs./35/

Sites where PFOA has been discharged, but where environmental liability and remediation litigation has not yet commenced, may represent a significant future liability for the company.

PENDING CONSUMER/PRODUCTS LIABILITY CASE REGARDING TEFLON

A lawsuit filed against DuPont filed in 2005 seeks $5 billion in damages due to the company's alleged failure to warn consumers of health risks associated with Teflon cookware. In May 2006, a judicial panel ruled that lawyers in 13 national cases involving 16 lawyers representing more than 73 clients should meet. DuPont's attorney maintained that Teflon could not be proven toxic in court because "not one study has shown that there is any harm to consumers," but the plaintiffs assert that the actionable harm involved was the lack of disclosure of risk information known to the company, rather than a claim for physical injury.

POTENTIAL ENVIRONMENTAL LIABILITY FOR USERS OF DUPONT PFOA AND RELATED PRODUCTS

In addition, sites where DuPont's PFOA products are used by other manufacturers may represent an even larger liability pool, not only for those manufacturers, but also for DuPont. For example, fluorotelomer based carpet coating products are reported to be widely used in Dalton, Georgia, the carpet production "capital" of the U.S.

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IN OUR OPINION, ADDITIONAL CONSUMER AND ENVIRONMENTAL LIABILITY CASES APPEAR LIKELY.
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Dr. Paul Rosenfeld, an adjunct professor at the UCLA School of Public Health who toured carpet facilities in that area, has described extraordinarily lenient practices for managing Stainmaster exposures and wastes. In public comments made at the Mealey's C8/PFOA Science, Risk & Litigation Conference in October 2005, he described how the carpets are dipped in open vats of stain repellants containing chemicals that may contain or break down into PFOA. These carpet facilities attempt to dry the Stainmaster coating by lifting carpets from the vats, which results in contaminating the air space of workers. Massive volumes of wasted (or colored) Stainmaster were then dumped down the sewers./36/

Some purchasers of PFOA-related products from DuPont have also suffered negative publicity and environmental scrutiny due to releases of PFOA from their production processes. A small Delaware factory, PTFE Compounds, Inc., which ran a Teflon baking operation, quietly dispersed unknown quantities of Teflon-related

pollutants for years without catching the attention of regulators. In 1997, state regulators finally caught up with PTFE Compounds, Inc., when they learned the company had exceeded annual pollution limits in each of the previous four years. Paul Foster, an environmental engineer with the Delaware Department of Natural Resources and Environmental Control (DNREC), estimates that the plant would have released about 75 lbs of PFOA-related pollution per year. In 2003, DNREC took actions aimed at reducing PFOA-related pollution by requiring additional pollution control measures targeting these emissions. Regulators say only rough estimates are available for the quantity of Teflon-related pollutants released by the company into the environment over the years. Nor is
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information available on the levels of worker exposure to Teflon-related pollutants, which is monitored at larger facilities with similar operations./37/

DuPont supplies companies of various sizes, both small ones similar to PTFE Compounds, Inc. as well as larger ones. Any of these companies may have released similar pollutants into the environment with little or no notice from regulators until recently. Now, regulatory scrutiny on these companies is growing, with concomitant pressure to eliminate emissions of PFOA and PFOA precursors.

POTENTIAL CONSUMER LIABILITY: CLASS ACTION AND "DUTY TO WARN" NOTICES

Companies receiving notices of a potential legal duty to warn consumers of PFOA exposure included Rug Doctor, Stanley Steemer, Conagra Foods, McDonalds, Taco Bell, Levi Strauss, GAP, W.L. Gore, Wal-Mart, Sears, Mannington, Mohawk Industries, and Shaw Industries.

Retailers and manufacturer purchasers of PFOA-containing products are being made aware of potential liabilities associated with sales of those products. Consumer protection laws in many states, including statutory and common law, provide that sellers of products may have a duty to warn consumers if they are exposing them to products that pose an unreasonable risk to health or safety.

In addition, consumer-related liability notices have been spread throughout the array of consumer-oriented markets where PFOA-related products are sold. On August 9, 2005, the United Steelworkers (USW) union released a statement saying they had sent letters to major carpet cleaning retailers and wholesalers,

fast food chains, and major retail clothing companies, informing them that they may have "a legal duty to warn" their customers about potential health risks associated with exposure to products that contain PFOA. These letters informed recipients that they could face legal liability in the event that consumers sue and prove harm to their health./38/

On December 21, 2005, the United Steelworkers released another statement, reporting that they had mailed advisory information on potential PFOA-related health hazards to over 4,500 retail carpet dealers and to the CEOs of 35 carpet manufacturing companies. "We sincerely hope that our efforts will encourage carpet manufacturers and retailers to provide warnings and thereby protect the public," said Ken Test, Chair of the USW DuPont Council, a coordinating body for 1,800 USW members at DuPont. "Carpet company employees who may have the highest exposure to PFOA must also be warned and protected."/39/ USW reports that it has sent about 40,000 "duty to warn" letters to various firms that may be buying PFOA-containing products.
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The companies who have received duty to warn notices from USW read like a Who's Who of household consumer products. According to USW press releases, some of the thousands of companies

receiving the notices included Rug Doctor, Stanley Steemer,
McDonalds, Taco Bell, Papa John's, Pizza Hut, KFC, California
Pizza Kitchen, Levi Strauss, Conagra Foods, GAP, W.L. Gore, Eddie
Bauer, J. Crew, Wal-Mart, Sears, Nordstrom, Dillard's, Dalton
Carpet Outlet, Carpet Giant, Carpet Land, Mannington, Mohawk
Industries, and Shaw Industries.

PFOA, SHAREHOLDER VALUE AND DUPONT FINANCIAL REPORTING

In November 2006, Amalgamated Bank's LongView Funds refiled a proposal to be voted at DuPont's 2007 annual meeting urging the board of directors to set forth options for an expedited phase-out of PFOA. The same proposal won 29 percent of the votes cast in 2006.

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DUPONT IS NOT INTENT ON ENDING ITS PRODUCTION OF FLUOROTELOMERS, THOUGH STUDIES ALREADY UNDERWAY MAY SHOW THAT THOSE PRODUCTS CAN DEGRADE TO PFOA IN USE OR IN THE ENVIRONMENT. THE COMPANY'S PFOA PROBLEMS MAY ONLY BE BEGINNING.
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POTENTIAL DEGRADATION OF FLUOROTELOMERS

While DuPont has announced its intent to end the production and use of PFOA by 2015, it has not declared an intent to end the production or use of fluorotelomers. Yet some experts expect that that fluorotelomers may break down to PFOA in use or in the environment. Thus, despite the progress made on its commitment to reduce PFOA content in products sold by DuPont, it is unclear whether the current plan of action will actually free DuPont from its PFOA problem eight years from now. Even if the alcohol monomers have been removed from fluorotelomers, some experts believe that over time fluorotelomers may break down in use or in the environment to the constituent alcohols and then to PFOA. Numerous studies confirm the breakdown of fluorotelomer alcohols to PFOA.

3M found that after the Zonyl BA-type mixture of telomer alcohols was exposed to activated sewage sludge for 16 days, the mixture of fluorotelomers had largely decomposed to perfluorinated carboxylic acids containing between 5 and 12 carbon atoms. Degradation of the longer chain fluorotelomers (16 carbons in length) was too slow to measure./40/

In 1981, a 3M study found fluorinated telomer alcohols fed to lab rats metabolized into PFOA. The study was published in the journal ANALYTICAL BIOCHEMISTRY./41/

A 2004 study by University of Toronto confirmed that Telomer alcohols degrade into PFOA through oxidation./42/

Already some companies have begun to avoid telomers, not just PFOA contaminated items. Burger King, for example, stopped selling food in telomer-coated boxes in 2002. McDonald's has said it uses such boxes, but would not say whether it still does./43/
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DuPont management's position is that once it removes alcohol impurities from fluorotelomers PFOA will not form in degradation of fluorotelomer products. Further scientific research is underway to assess whether fluorotelomers, once treated as planned by DuPont, may nevertheless break down to telomer alcohols and then to PFOA.

LACK OF DISCLOSURE RELATED TO PFOA IMPACTS ON EARNINGS

DuPont has not disaggregated the impact on shareholder value, or company earnings, resulting from concerns related to PFOA other than to say that if PFOA were banned it could cost the company approximately $1 billion per year.

There is no reporting in DuPont shareholder reports as to the extent of drop in U.S. sales of Teflon or other PFOA-related products as negative publicity has mounted. What we do know from public reports is that company mounted a PR campaign in attempt to quell public concern, both posting full-page ads in national media, and corresponding directly with sellers of products that may be affected, or are raising these concerns with DuPont. We believe shareholder value remains at risk as long as PFOA is used in manufacture, or can be a breakdown byproduct, of DuPont products.

Despite DuPont's growing realization that it must eventually quit PFOA chemistry, we believe the evidence contained in this report shows that shareholder value remains at risk from the company's decisions, past and present, to rely on PFOA chemistry in its product lines. Althought DuPont has announced its intent to move out of PFOA use and production by 2015, consumers and DuPont industrial customers are not bound by DuPont's long term PFOA-elimination timeline. They are already demanding and securing PFOA-free products, jeopardizing segments of DuPont's Billion dollar per year PFC product lines. Moreover, DuPont currently intends to continue production and use of fluorotelomers. These products may also break down to PFOA in use or in the environment, as independent scientific testing is currently assessing.

Based on the company's disclosures, the product lines involved represent at least $1 billion dollars in annual revenues. Shareholders should press the management for a more expeditious phase-out of the use of PFOA and of any substances

that can break down to PFOA, for better disclosure of the financial impacts the current issues are having and of the options for expediting DuPont's movement out of PFOA chemistry.

/1/ "Quaker Fabric launches safer Scotchgard fabric," Home Textiles Today, September 18, 2006.
/2/ WHAT IS PFOA? From DuPont website online: http://www1.DuPont.com/DuPontglobal/corp/documents/US/en_US/news/releases/pdf/WhatisPFOA.pdf
/3/ Letter from Kenneth A. Cook, President, Environmental Working Group to Michael Leavitt, Administrator, U.S. Environmental Protection Agency (November 17, 2004) (Citations omitted).
/4/ Juliet Eilperin, "DuPont, EPA settle chemical complaint," WASHINGTON POST, December 15, 2005. $5 million of the $6.25 million committed to environmental projects will fund the Fluorotelomer-based Product Biodegradation Testing Supplemental Environmental Project(SEP). The EPA states that this initiative: "will help the public to better understand the inherent degradation potential of fluorotelomer-based products to form PFOA and the behavior of such products when released to the environment." www.epa.gov/compliance/resources/cases/civil/tsca/DuPont121405.html 2/14/2005
/5/ "Cancer rates a high in C8 areas: Year-old study by state released inadvertently," Charleston Gazette, March 22, 2007
<PAGE>

/6/ Randall Chase, "Teflon chemical likely a carcinogen, panel says," ASSOCIATED PRESS, February 16, 2006
/7/ Nonstock chemicals upset behavior, Science News 169.12: p. 190(1). March 25, 2006
/8/ Douglas Fischer, "Possible carcinogen may play favorites," OAKLAND TRIBUNE, March 9, 2006
/9/ Sara Schaeffer Munoz, "EPA probes safety of key chemical in Teflon," WALL STREET JOURNAL , January 31, 2006
/10/ Martin Middlestaedt, "U.S. acts against chemical in non-stick pans," Globe & Mail, February 4, 2006
/11/ Ohio Citizen Action, http://www.ohiocitizen.org/campaigns/DuPont_c8/kro_mart.htm
/12/ "Wal-Mart's action on chemicals in packaging to take a year," Ohio Citizen Action press release, http://www.ohiocitizen.org/campaigns/DuPont_c8/wal-mart%20statement.doc
/13/ Ohio Citizen Action, http://www.ohiocitizen.org/campaigns/DuPont_c8/DuPont_c8.html
/14/ Jerry Hirsch, Los Angeles Times
/15/ Ibid.
/16/ Marian Burros, "As Teflon troubles pile up, DuPont responds with ads," NEW YORK TIMES, February 8, 2006
/17/ "Quaker Fabric launches safer Scotchgard fabric," HOME TEXTILES TODAY, September 18, 2006
/18/ PR Newswire, Europe, New York, February 9, 2006
/19/ Rebecca Renner, "Clean & Green," SCIENTIFIC AMERICAN, January 2006
/20/ Rebecca Renner, "The Long and the Short of Perfluorinated Replacements," ENVIRONMENTAL SCIENCE &

TECHNOLOGY Vol. 40 Issue 1, Jan 1, 2006
/21/ Barry Rosenbaum, "Rocket Science Gives Surfactants a Boost," POLYMERS PAINT COLOR JOURNAL 194, vol. 4483 (Dec. 2004)
/22/ Rebecca Renner, "Technology Solutions: The Long and the Short of Perfluorinated Replacements," ENVIRONMENTAL SCIENCE & TECHNOLOGY Vol. 40, Issue No, 1
/23/ Ibid
/24/ Polyfox Factsheet.pdf
http://www.omnova.com/products/chemicals/documents/polyfoxFactSheetFinal_2_06.pdf, 2/21/06
/25/ Ibid.
/26/ Charles Baldwin et al "A Novel Nonstick Porcelain Enamel, Appliance Vol.61, No. 11, November 2004
/27/ Financial Times Information, Global Newswire Asia-Africa Intelligence Wire, December 9, 2005
/28/ Financial Times Information, Global Newswire Asia-Africa Intelligence Wire, August 23, 2004
/29/ Olivia Chung, "Teflon Comes Unstuck in China Mass Panic," Global News Wire - Asia Africa Intelligence Wire, July 22, 2004
/30/ AFX European Focus October 14, 2004
/31/ Environmental Science and Technology Outline, Issue 1/(32-410, January 4, 2006
/32/ Wade Rawlins, "Emission in ground water add to DuPont's tasks," The News & Observer (North Carolina), February 12, 2006
/33/ Clean Water for North Carolina press release, January 30, 2006
/34/ Associated Press, "Court Clears Settlement in DuPont Case," February 28, 2005
/35/ Stan Cox, "Toxic Teflon: Compounds from household products found in human blood," ALTERNET.ORG, January 2, 2007
/36/ Paul Rosenfeld, public comments at Mealey's C-8/PFOA Science, Risk & Litigation Conference October 24-25, 2005. By contrast it should be noted that some carpets, notably Shaw Ecoworks' Carpet, have distinguished themselves by avoiding the use of PFOA related products. Healthy Building News, February 23, 2006.
/37/ Jeff Montgomery, "Delaware plant releases C8-type chemicals," THE NEWS JOURNAL (Wilmington, Delaware), February 4, 2006
/38/ United Steelworkers Press Release, August, 9, 2005
/39/ United Steelworkers Press Release, December 21, 2005
/40/ Lange, Cleston C., "Biodegradation Screen Study for Telomer-Type Alcohols," November 6, 2002.
http://www.ewg.org/reports/pfcworld/pdf/sludge_full.pdf
Lange, Cleston C. "The Aerobic Biodegradation of N-EtFOSE Alcohol by the Microbial Activity Present in Municipal Wastewater Treatment Sludge." November 02, 2000.
http://www.ewg.org/reports/pfcworld/pdf/226-1030a078.pdf
<PAGE>

/41/ Fred Biddle and Jennifer Goldblatt. "Dupont's troubled chemical C-8 is widespread in the environment. How did it get there, and should we be worried?" The News Journal (Delaware), February 23, 2003.

/42/ Dinglasan, Mary J. A., Yun Ye, Elizabeth A. Edwards and Scott A. Mabury. 2004. "Fluorotelomer Alcohol Biodegradation Yields Poly- and Perfluorinated Acids." ENVIRONMENTAL SCIENCE AND TECHNOLOGY 38(10):2857-2863.
/43/ Tom Avril, "Chemical in Teflon, other goods is turning up in disturbing places," Seattle Times, October 1, 2004. http://seattletimes.nwsource.com/html/health/2002050937 teflon01.html